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VOLUME VII

March 25th, 1918

# 臺灣植物圖譜

臺灣植物誌料

第七卷

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## Icones Plantarum Formosanmarum

nec non et

Contributiones ad Floram Formosanam

or

Icones of the Plants of Formosa, and Materials for a Flora of the  
Island, based on a Study of the Collections of the Botanical  
Survey of the Government of Formosa

By

Bunzō Hayata, *Rigakuhakushi*

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## NOTICE



- I. Dicotyledons—Polypetalous: Ranunculaceæ—Rosaceæ. Published September 10th, 1911.
- II. 1. Conspectus of the Flora of Formosa, Saxifragæ—Dipsacæ.  
2. New or Noteworthy Plants of Formosa. Published October 15th, 1912.
- III. 1. Contributions to the Flora of Formosa, I.  
2. On the Systematic Position of *Mitrastemon*, as a Genus representing a special Tribus of the Rafflesiaceæ. Published December 25th, 1913.
- IV. Contributions to the Flora of Formosa, II. Published November 25th, 1914.
- V. Contributions to the Flora of Formosa, III. Published November 25th, 1915.
- VI. Contributions to the Flora of Formosa, IV. Published November 25th, 1916.
- VII. Contributions to the Flora of Formosa, V. Published March 25th, 1918.
- VIII. Will be published in September 1918.





**ICONES PLANTARUM FORMOSANARUM**

**NEC NON ET**

**CONTRIBUTIONES AD FLORAM**

**FORMOSANAM**

**VII**

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AUCTORE

**Bunzo Hayata**





TO HIS EXCELLENCY BARON TEIBI ANDO,

GOVERNOR GENERAL OF FORMOSA.

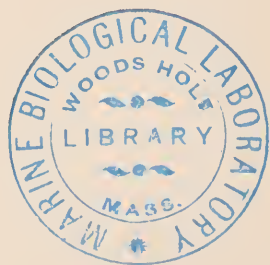
SIR,

I have the honour to submit to your Excellency the seventh volume of the *Icones Plantarum Formosanarum, nec non et Contributiones ad Floram Formosanam* by BUNZŌ HAYATA, D. Sc.

HIROSHI SHIMOMURA,

CIVIL GOVERNOR OF FORMOSA.

November 1, 1917, Taihoku.







## INTRODUCTION.

As was announced in the introduction of the third volume of this work, the present volume is principally devoted to the fifth part of those studies which have for the most part been upon new material, collected since 1912.

The volume contains studies on species and varieties ranging from the Berberideæ down to the Selaginellaceæ. All the species of Phanerogamous plants are here arranged, as in the preceding volumes, after the system of BENTHAM and HOOKER; while those of vascular cryptogams are arranged after the system of ENGLER and PRANTL. Of the species and varieties mentioned in this work, 47 are proposed as new species and 3 are regarded as new varieties of known species. One genus, *Polliniopsis*, is proposed as a new, while 4 genera are mentioned as new to the flora of the island. The latter genera are as follows:—

*Sphaerocaryum*

*Axonopus*

*Euchlæna*

*Muehlenbergia*

Thus, up to the present date, the total number of species of the flora, so far as is known, is 3359 species and 57 varieties belonging to 1173 genera and 169 families.\*

Finally, I avail myself of this opportunity to tender my hearty thanks to the officials of the Government of Formosa, to whom I am much indebted for help in the collection of material and in the publication of this work.

B. HAYATA.

October 1917, Taihoku and Tōkyō.

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\* Readers will notice that there are some differences between the numbers given in this volume and those in the preceding one. This is mainly explained by the fact that, since the publication of the General Index to the Flora of Formosa, a considerable number of doubtful species have been excluded from the flora of the island.

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## Contributions to the Flora of Formosa.

## V.

## Berberideæ.

*Mahonia* NUTT.

**Mahonia tikushiensis** HAYATA (Pl. I.) Ic. Pl. Formos. V. p. 5.

## Pittosporeæ.

*Pittosporum* BANKS.

**Pittosporum daphniphylloides** HAYATA (Pl. II.) Mater. Fl. Formos. p. 34; Ic. Pl. Formos. V. p. 6.

## Caryophylleæ.

*Stellaria* LINN.

**Stellaria reticulivena** HAYATA sp. nov. (Fig. 1.) Herba annua radiatim diffusa. Caulis ascendens diffuse ramosus vel haud ramosus tetragonus 1 mm. latus ad angulos hirsutus vel ad nodos plus hirsutus, internodiis inferioribus brevioribus superioribus longioribus 5-6 cm. longis. Folia ad nodos caulis versus totam longitudinem oppositam sita ovata circ. 2 cm. longa 12 mm. lata apice triangulare acuta basi rotundata sessilia margine integerrima marginata breve ciliolata plana, costa supra impressa subtus elevata, pagine supra subglabra subtus ad costas retrorse hirsuta cæterum glabra supra pallido-viridia haud nitida subtus pallidissima, venulis sub luce translucenti reticulatis. Flores cymosi, cymis terminalibus rarius axillaribus longe pedunculatis diffuse ramosis subglabris ad ramificationem bracteis minutis oppositis instructis, bracteis scariosis hyalinis oblongis concavis obtusis  $1-1\frac{1}{2}$  mm. longis, pedicellis 1-2 cm. longis gracillimis. Sepala scariosa ovato-lanceolata  $2\frac{1}{2}$  mm. longa 1 mm. lata apice acuminata basi plus minus contracta margine hyalina integra glabra medio dorso pallido-viridia. Petala 5 alte 2-fida, segmentis lineari-lanceolatis

2 mm. longis  $\frac{1}{4}$  latis apice obtusis, basi attenuata alba. Stamina 10, filamentis filiformibus hyalinis circ. 2 mm. longis, antheris minutis reniformi-globosis. Ovarium ovoideum trigonum vel hexagonum 1 mm. longum  $\frac{2}{3}$  mm. latum glabrum, stylis 3 apice recurvis  $\frac{1}{2}$  mm. longis. Capsula ovoidea 3 mm. longa a medio sursum 6-valvatim dehiscens. Semina minuta oblonga  $\frac{2}{3}$  mm. longa plus minus complanata utrinque obtusa rubescentia rugosa.

HAB. Taiheizan, leg. S. SASAKI et B. HAYATA, Mai. 1917.

Near *S. micrantha* HAY.; but differs from it by the ovate or nearly cordate leaves. The leaves of *S. micrantha* are much narrower than those of this new species.

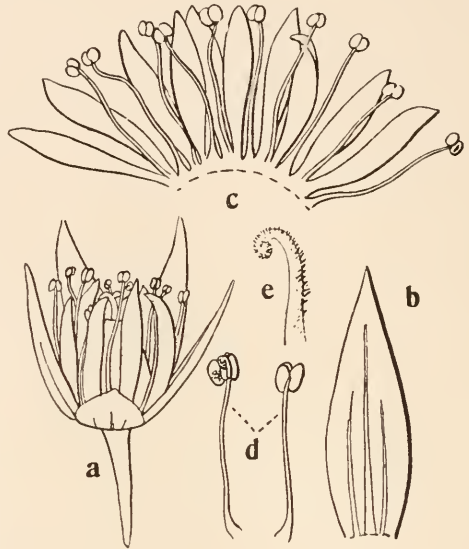


Fig. 1, *Stellaria reticulivena* HAYATA; a, a flower; b, a sepal; c, corolla with stamens, expanded; d, stamens; e, a portion of a style.

## Ternstroemiaceæ.

### *Thea* LINN.

**Thea** (Sect. *Camellia*) **hozanensis** HAYATA sp. nov. (Fig. 2) Arborescens. Truncus plus minus tortus. Rami et ramuli validiusculi cinerascens haud lenticellati. Folia alterna coriacea oblonga vel obovato-oblonga 8–9 cm. longa  $3\frac{1}{2}$ –4 cm. lata apice subito acuminata ad summum obtusa basi acuta margine serrulata utraque glaberrima, costa supra haud vel vix elevata subtus haud elevata, venis primariis lateralibus utroque latere 7–8 mediis  $50^\circ$  a costa egressis rectis apice furcatim ramosis, petiolis 8–7 mm. longis glabris. Flores terminales solitarii vel geminatim siti infundibuliformes 4 cm. longi  $4\frac{1}{2}$  cm. lati pallido-rosei. Sepala coriacea multa exteriora minora interiora majora, extima minuta lunuliformia 3 mm. longa 6 mm. lata, intima rotundata 12 mm. longa totiusque lata apice rotundata extus intusque sericeo-pubescentia margine membranacea glabra ciliolata. Corolla campanulato-

infundibuliformis, tubo late cylindrico-obconico basi 5 mm. lato apice 10 mm. lato 10 mm. longo, limbo 5-partito, segmentis subpatentibus rotundatis  $2\frac{1}{2}$  cm. in diametro apice rotundatis ad centrum tenuiter sinuatis basi contractis margine integris venulis reticulatis. Stamina  $\infty$ , filamentis ad  $\frac{2}{3}$  altitudinem connatis glabris 3 cm. longis, antheris oblongo-ellipticis 2 mm. longis  $1\frac{1}{2}$  mm. latis. Ovarium conico-globosum  $2\frac{1}{2}$  mm. longum totiusque latum glabrum apice ad stylum abeuns, stylo glabro  $2\frac{1}{2}$  cm. longo filiformi apice trifido, segmentis 3 mm. longis.

HAB. Hōzan prope Keitao, ad 5000 ped. alt. leg. B. HAYATA, Aprili. 1916.

Near *Thea japonica*; but differs from



Fig. 2, *Thea hozanensis* HAYATA.

it by the funnel-shaped corolla and by the obtuse buds. In the Japanese species, the corolla is obconical but not attenuate towards the base, and the buds are acuminate at the apex.

**Thea** (sect. *Camellia*) **Nakaii** HAYATA sp. nov. Truncus et habitudo ut *T. japonica*. Rami et ramuli cinerascens versus apicem purpurascens. Gemmae fusiformi-acuminatae. Folia coriacea oblonga vel obovato-oblonga 10-8 cm. longa 5-5 $\frac{1}{2}$  cm. lata apice breve cuspidato-acuta ad summum obtusa basi acuta obtusa vel rotundata margine sursum minute serrulata deorsum integra, costa supra haud vel vix elevata, petiolis 1 cm. longis glabris. Flores terminales solitarii vel geminati. Sepala multi-seriatim disposita ut ea *Theae japonicae*. Corolla late obconica 4 cm. longa, tubo late obconico  $1\frac{1}{2}$  cm. lato, limbo 5-lobato, lobis 5 rotundatis 2 cm. longis 3 cm. latis apice emarginatis basi cuneato-contractis. Stamina  $\infty$ , exteriora 3 cm. longa, filamentis usque ad medium connatis. Ovarium glabrum conico-globosum  $2\frac{1}{2}$  mm. latum 2 mm. longum, stylo filiformi 2 cm. longo apice trifido, ramis 2 mm. longis.

HAB. Giran: Taikotanzan, leg. S. NAKAI, Jan. 1915.

Near *Thea japonica*, but differs from it by the leaves which are, in this new species, generally broader, more shortly cuspidate and more minutely serrulate than those of the Japanese species. In dried specimens, the costae



of the leaves of the Formosan plant are generally not elevated, but those of the Japanese are prominently elevated.

### Geraniaceæ.

#### *Geranium* LINN.

**Geranium uniflorum** HAYATA (Pl. III.) Fl. Mont. Formos. p. 65.

### Rosaceæ.

#### *Rubus* LINN.

##### *Conspectus of the subgenera.\**

- A. Fruticuli; caules solo adpressi aculeati. .... *Chamæbatus* I.
- B. Fruticosi; caules scandentes vel arcuato-prostrati.
  - α. Stipulæ latæ, liberæ vel subliberæ ..... *Malachobatus* II.
  - β. Stipulæ lineares vel filiformes petiolo adnatæ ... *Idæobatus* III.

##### Subg. I. *Chamæbatus*.

##### *Conspectus of the species.*

- A. Leaves 3-lobed, branches manifestly aculeolate .....
    - ..... 1. *R. pectinellus* var. *trilobus*.
  - B. Leaves 5-lobed, nearly unarmed.
    - a. Leaves smaller 2-3 cm. in diameter; branches hirsute but not villose.....2. *R. calycinoides*.
    - b. Leaves larger 5 cm. in diameter; branches densely villose ..... 3. *R. pentalobus*.
1. **Rubus pectinellus** MAXIM. var. **trilobus** KOIDZ. (Fig. 3-a). Conspect. Ros. Jap. p. 108.

*R. pectinellus* HAYATA (non MAXIM.) Fl. Mont. Formos. p. 80.

- 2. **Rubus calycinoides** HAYATA (Fig. 3-b) Ic. Pl. Formos. III. p. 88.
- 3. **Rubus pentalobus** HAYATA (Fig. 3-c) Fl. Mont. Formos. p. 80.

##### Subg. II. *Malachobatus*.

##### *Conspectus of the species.*

- A. Inflorescence terminal simple racemose, peduncles solitary.
  - a. Calyx and pedicels very slightly aculeolate ... 1. *R. Kawakamii*.
  - b. Calyx and pedicels densely aculeolate.

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\* FOCKE, W. O.—Species Ruborum, in Bib. Bot. XVII.—Heft 72.

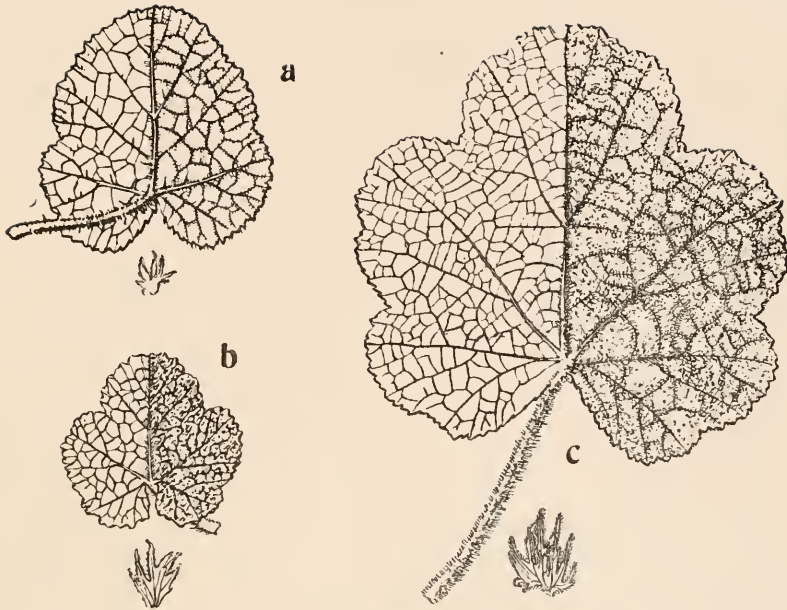


Fig. 3; a, *Rubus pectinellus* MAXIM. var. *trilobus* Koidz.; b, *R. calycinoides* HAYATA; c, *R. pentalobus* HAYATA.

- α. Leaves ashy-white beneath..... 2. *R. Swinhoei*.
  - β. Leaves not whitish beneath..... 3. *R. adenotrichopodus*.
- B. Inflorescence variously paniculate, or flowers fasciculate, rarely solitary, axillary.
  - a. Leaves penni-nerved..... 4. *R. floribundopaniculatus*.
  - b. Leaves 3-5-nerved.
    - α. Leaves glabrous on both sides.
      - \* Leaves aculeolate..... 5. *R. suishaensis*.
      - \*\* Leaves not aculeolate ..... 6. *R. Mori*.
    - β. Leaves hairy beneath.
      - × Leaves rounded not or very slightly lobed. .... 7. *R. Shimadai*.
      - ×× Leaves manifestly lobed.
        - \* Leaves acute or caudate at the apex.
          - Leaves prominently reticulate. .... 8. *R. nantoensis*.
          - Leaves not reticulate... 9. *R. Lambertianus*.

\*\* Leaves obtuse at the apex.

□ Leaves lanate... 10 *R. Rolfei* var. *lanatus*.

□□ Leaves tomentose

△ Leaves membranaceous. ....

...11. *R. alceaefolius* var. *emigratus*.

△△ Leaves coriaceous.

○ Stipules fimbriate from the base.

..... 12. *R. lasiniato-stipulatus*.

○○ Stipules obovate lacerate at the apex.

+ Leaves silky tomentose beneath.

.....13. *R. rugosissimus*.

++ Leaves tomentose beneath, not

silky.....14. *R. formosensis*

= *R. randaiensis*.

1. **Rubus Kawakamii** HAYATA (Fig. 4-a) Mater. Fl. Formos. p. 91.

Note: Calyx with purple spines; petals white or slightly purple.

2. **Rubus Swinhœi** HANCE (Fig. 4-b); MATSUM et HAYATA Enum Pl. Formos. p. 123.

3. **Rubus adenotrichopodus** HAYATA (Fig. 4-c) Ic. Pl. Formos. V. p. 49.

4. **Rubus floribundo-paniculatus** HAYATA (Fig. 5-a) Ic. Pl. Formos. III. p. 89.

**Rubus suishaensis** HAYATA sp. nov. (Fig. 5-b) Suffrutex; ramuli subglabri fulvo-rubescences teretes aculeolati, aculeis 2-3 mm. longis complanatis. Folia simplicia triangulari-ovata 8 cm. longa  $5\frac{1}{2}$  cm. latar apice acuminata basi late cordata vel late truncata tenuiter 3-lobata vel haud lobata margine tenuiter et simpliciter serrulata, serrulis a se 3 mm. remotis brevissimis, utraque pagine subglabra sed supra ad costas dense subtus tenuiter hirsuta, costa subtus remote aculeolata, trinervia, petiolis  $1-1\frac{1}{2}$  cm. longis aculeolatis plus minus hirsutis vel subglabris. Racemi axillares 1-2-florati basi bracteis 4-5 suffulti, bracteis ovatis vel ovato-rotundatis fulvo-rubescensibus 3-6 mm. longis coriaceis intus glabris extus hirsutis, rhachibus vel pedunculis villosis.

hirsutis. Calycis cupula extus dense villosa intus glabra ad centrum villosa ; calycis lobi oblongo-triangulares 5 mm. longi 3 mm. lati apice acuti ad acumen 1 mm. longum abeuntes basi haud contracti utraque pagine villosi. Petala rotundata longe unguiculata, unguibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis, lamina rotundata 4 mm. longa totiusque lata integra. Stamina  $\infty$ , antheris

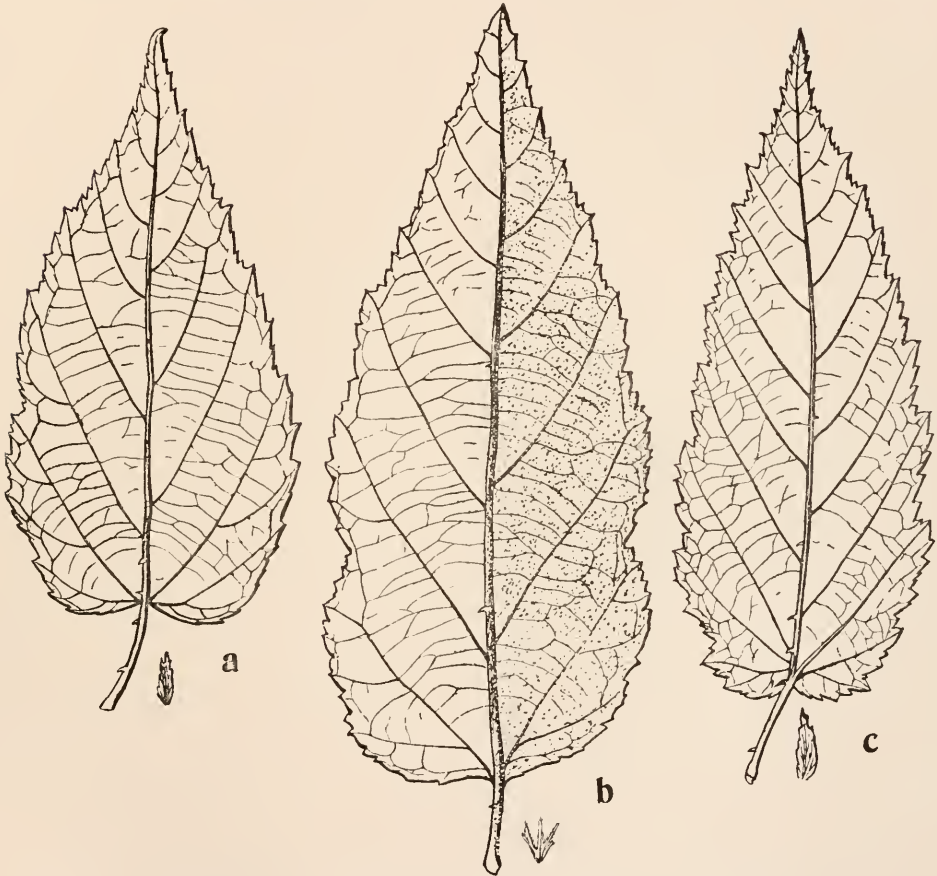


Fig. 4; a, *Rubus Kawakamii* HAY.; b, *R. Swinhoei* HANCE; c, *R. adenotrichopodus* HAY.

rotundato-ellipticis  $\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm. latis apice tenuiter basi alte lobatis. Receptaculum ovoideum sessile hirsutum. Ovarium semi-ovoideum 1 mm. longum dorso longe hirsutum, stylo  $1\frac{1}{2}$  mm. longo glabro, stigmate terminali.

*Rubus corchorifolius* L. var. *glaber* MATSUM. in MATSUM. et HAYATA Enum. Pl. Formos. p. 121.

HAB. Holisha—Suisha, leg. C. OWATARI, Jan. 1898.

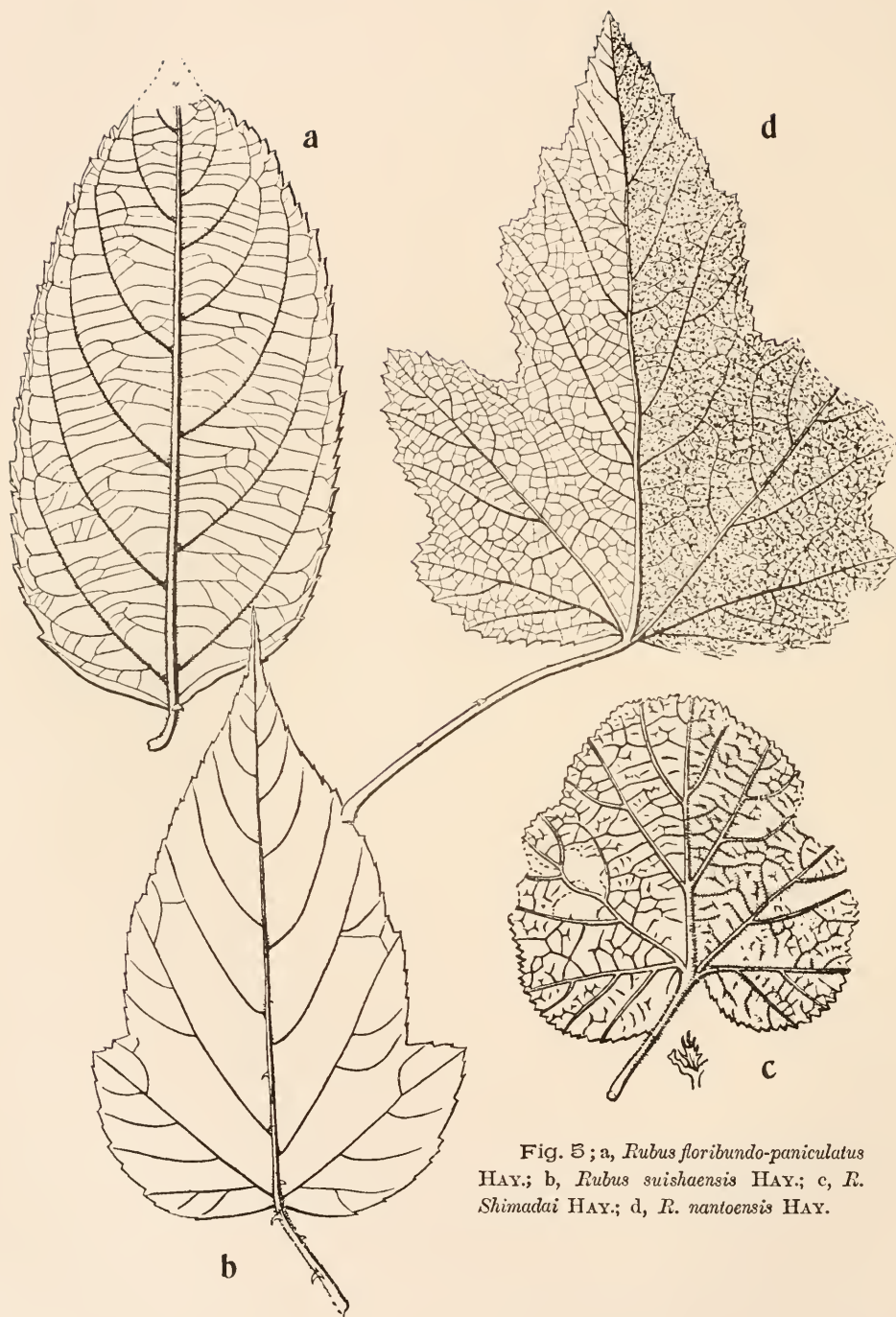


Fig. 5; a, *Rubus floribundo-paniculatus* HAY.; b, *Rubus suishaensis* HAY.; c, *R. Shimadai* HAY.; d, *R. nantoensis* HAY.



Near *R. corchorifolius*, but differs from it by the quite glabrous trinerved leaves.

6. **Rubus Morii** HAYATA Mater. Fl. Formos. p. 90.
7. **Rubus Shimadai** HAYATA (Fig. 5-c) Ic. Pl. Formos. III. p. 94.
8. **Rubus nantoensis** HAYATA (Fig. 5-d) Mater. Fl. Formos. p. 92.
9. **Rubus Lambertianus** SER. (Fig. 6-a) HAYATA et MATSUM. Enum Pl. Formos. p. 121.

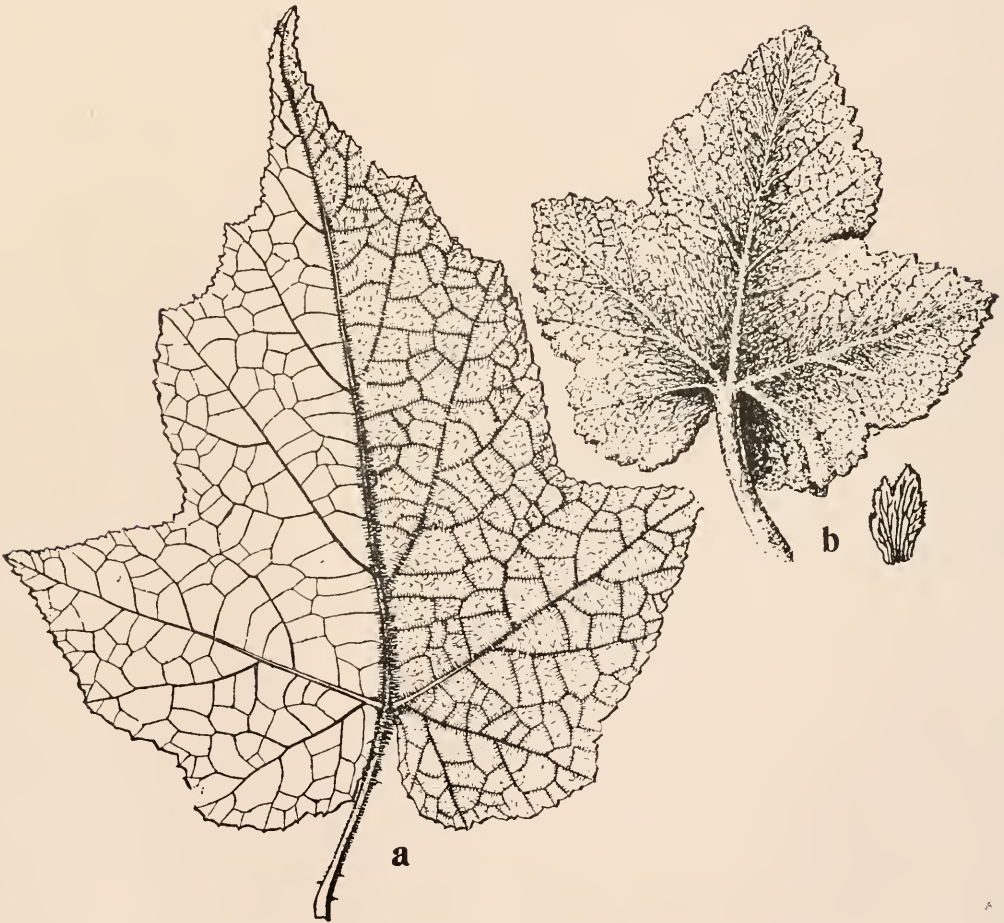


Fig. 6; a, *Rubus Lambertianus* SER.; b, *Rubus Rolfei* VIDAL var. *lanatus* HAY.

10. **Rubus Rolfei** VIDAL var. **lanatus** HAYATA (Fig. 6-b) Fl. Mont. Formos. p. 81.

11. **Rubus alceaefolius** POIR? var. **emigratus** FOCKE (Fig. 7). Sp. Rub. p. 79; Koidz. Conspect. Ros. Jap. p. 161.



Fig. 7, *Rubus alceaefolius* POIR? Var. *emigratus* FOCKE.

12. **Rubus lasiniato-stipulatus** HAYATA (Fig. 8-a) Ic. Pl. Formos. III. p. 91. *R. moluccanus* HAYATA Ic. Pl. Formos. I. p. 228 (non LINN).  
13. **Rubus rugosissimus** HAYATA (Fig. 8-b) Ic. Pl. Formos. III. p. 93.

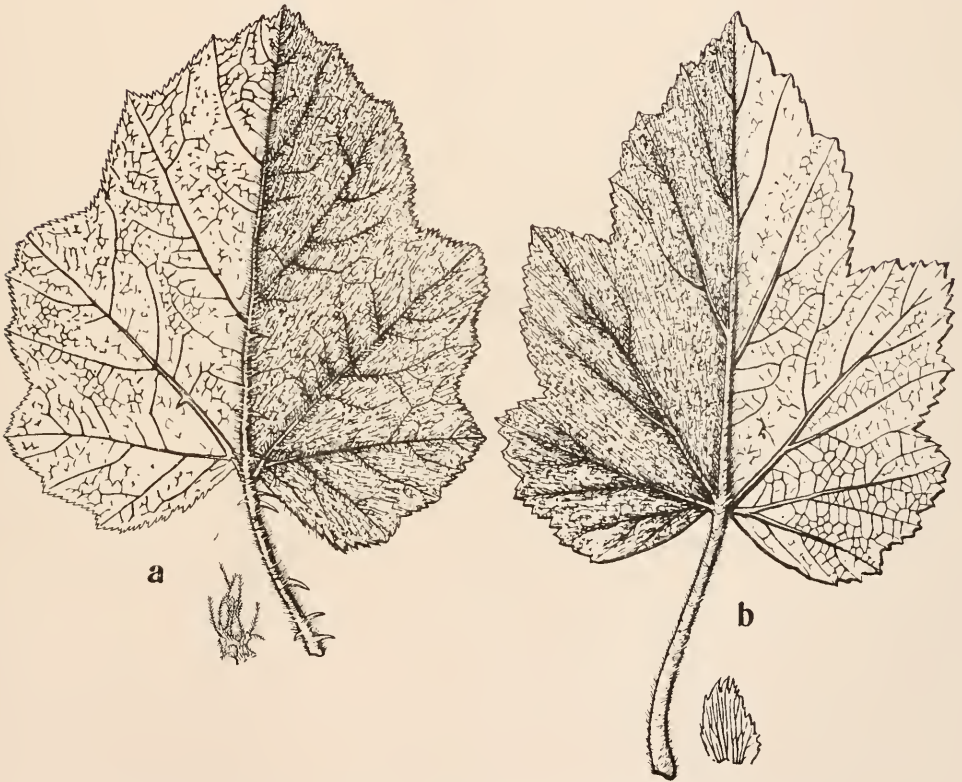


Fig. 8; a, *Rubus lasiniato-stipulatus* HAY.; b, *Rubus rugosissimus* HAY.

14. **Rubus formosensis** O. Ktze. (Fig. 9); Focke Monogr. Rub. p. 117.  
*R. randaiensis* HAYATA Mater. Fl. Formos. p. 93.



Fig. 9, *Rubus formosensis* O. Ktze.

Subg. III. *Idaeobatus*.

Key to the species.

## A. Leaves simple

- a. Calyx greenish in living specimens, but turning black when dried, nearly glabrous on the back leaving the margin hairy, petals white usually reflexed.....1. *R. conduplicatus*=*R. retusipetala*.
- b. Calyx greenish in living specimens, but turning pale brown when dried, finely pubescent on the back or aculeolate on the back, petals white usually erect or semi-closed.
  - α. Calyx aculeolate on the back
    - \*Leaves sinuately trilobed.....2. *R. taitoensis*.
    - \*\*Leaves shallowly trilobed
      - Leaves cordate at the base.....3. *R. mingetsensis*.
      - Leaves truncate at the base...4. *R. aculeatiflorus*.
  - β. Calyx simply pubescent
    - \*Carpels densely villose .....5. *R. arisanensis*.
    - 6. *R. arisanensis* var. *horishaensis*.
    - \*\*Carpels less villose.....7. *R. shinkoensis*.

## B. Leaves compound

- a. Very dwarf plant, erect, at most 10 cm. tall, leaflets small 1 cm. long quite glabrous.....8. *R. elegans*.
- b. Scandent, leaflets longer than 2 cm.
  - α. Stem, petioles, peduncles densely glanduloso-barbate.
    - \*Leaves trifoliolate glabrous, terminal leaflets rounded nearly 10 cm. in diameter ..... 9. *R. fasciculatus*.
    - \*\*Leaves 3-7-foliolate hirsute, terminal leaflet oblong less than 5 cm. long.
      - Branches and petioles not velvety, simply glanduloso-barbate. ....10. *R. glanduloso-calyeinus*.
      - Branches and petioles densely villose and glanduloso-barbate.
        - △Carpels hirsute.....11. *R. Somai*.
        - △△Carpels glabrous



- Synecarpium elliptical .....  
 .....12. *R. dolichocephalus*.
- Synecarpium rounded
  - +Primary veins manifestly impressed  
 above, elevate below.....  
 ..... 13. *R. euphlebophyllus*.
  - ++Primary veins not manifestly im-  
 pressed above .....  
 { 14. *R. ptiopetalus*.  
 { 15. *R. spherocephalus*.  
 { 16. *R. linearifolius* HAY.
- β. Stem, branches, petioles and peduncles not glanduloso-barbate.
  - Leaves glaucous velutinous on the lower surface
    - Leaflets smaller 1-2 cm. long. ....  
 .....17. *R. triphyllus*. = *R. parvifolius*.
    - Leaflets longer usually 5 cm. long.
      - △Racemes terminal ...18. *R. parvi-araliifolius*.
      - △△Cymes umbel-like axillary...19. *R. rarissimus*.
  - Leaves not glaucous velutinous below.
    - Leaves duplicately serrate
      - △Branches and petioles villose .....  
 .....20. *R. taiwanianus*.
      - △△Branches and petioles not villose
        - +Leaves quasiverticillate at the base of  
 the flowering branchlets.....  
 21. *R. parvipungens* = *R. hirsutopungens*.
        - ++Leaves simply alternate
          - Leaves more densely glandular dotted,  
 carpels fewer than the following  
 species .....  
 ..... 22. *R. glanduloso-punctatus*.
          - Leaves scarcely glandular dotted. ...  
 ..... 23. *R. parvirosaeifolius*.

- Leaves simply serrate, nearly glabrous
  - △Branches and petioles unarmed.....
    - ..... 24. *R. kotoensis*.
  - △△Branches and petioles armed
    - +Flowers axillary solitary.....
      - .....25. *R. fraxinifolius*.
    - ++Flowers in terminal or axillary cymes
      - Cymes many-flowered, leaves longer.
        - ..... 26. *R. fraxinifolius*.
      - Cymes few-flowered, leaves smaller...
        - ..... 27. *R. parvifraxinifolius*.

1. **Rubus conduplicatus** DUTHIE (Fig. 10-a, a'); HAYATA Mater. Fl. Formos. p. 89; Ic. Pl. Formos. I. p. 224, t. 24 et V. p. 57. *R. retusipetalus* HAYATA Mater. Fl. Formos. p. 94.

Note: Flowers campanulate; petals white reflexed; sepals fresh-green.

2. **Rubus taitoensis** HAYATA (Fig. 10-b); Mater. Fl. Formos. p. 96.

3. **Rubus mingetsensis** HAYATA (Fig. 10-c); Ic. Pl. Formos. V. p. 40.

Note: scandent shrub, 1-2 m. long, scarcely branched; leaves fresh-green or dark-green, shining above, but very pale below; costa and veinlets impressed above but elevated below; pedicels and sepals pale fresh-green; petals very pale green or very pale yellow.

4. **Rubus aculeatiflorus** HAYATA (Fig. 12-a) Ic. Pl. Formos. V. p. 39.

5. **Rubus arisanensis** HAYATA (Fig. 12-b) Ic. Pl. Formos. III. p. 87.

6. **Rubus arisanensis** HAYATA var. **horishaensis** HAYATA n.v. (Fig. 12-c). Folia ovato-oblonga haud lobata vel leviter triloba 9 cm. longa 6 cm. lata apice margine duplicato-serrulata acuminata basi leviter cordata 3-nervia. Calyx viridis. Petala alba. Fructus tenuiter pubescens luteo-ruber vel rubr. Caeterum ut typica.

HAB. Baikei, ad 2000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Differs from the type by the leaves which are not at all or very slightly lobed.

Note: Leaves dark-green above, calyx fresh-green, petals white; carpels villose; fruits finely villose reddish yellow or red, when quite ripened.



Fig. 10, a, a', *Rubus conduplicatus* DUTHIE; b, *Rubus taiioensis* HAY.;  
c, *Rubus migetsensis* HAY.

7. **Rubus shinkoensis** HAYATA (Fig. 12-d, d') Mater. Fl. Formos. p.  
95.



Fig. 12; a, *Rubus aculeatiflorus* HAY.; b, *Rubus arisanensis* HAY.; c, *Rubus arisanensis* HAY. var. *horishaensis* HAY.; d, d', *Rubus shinkoensis* HAY.

8. **Rubus elegans** HAYATA (Fig. 13-a) Fl. Mont. Formos. p. 79, t. IV.

9. **Rubus fasciculatus** DUTHIE (Fig. 13-b); HAYATA Mater. Fl. Formos. p. 90.

Note: Leaves dark-green shining above, costa and veins all impressed above but elevated below; prickles reddish; sepals pale-green; petals white.

10. **Rubus glanduloso-calycinus** HAYATA (Fig. 13-c) Ic. Pl. Formos. V. p. 42.

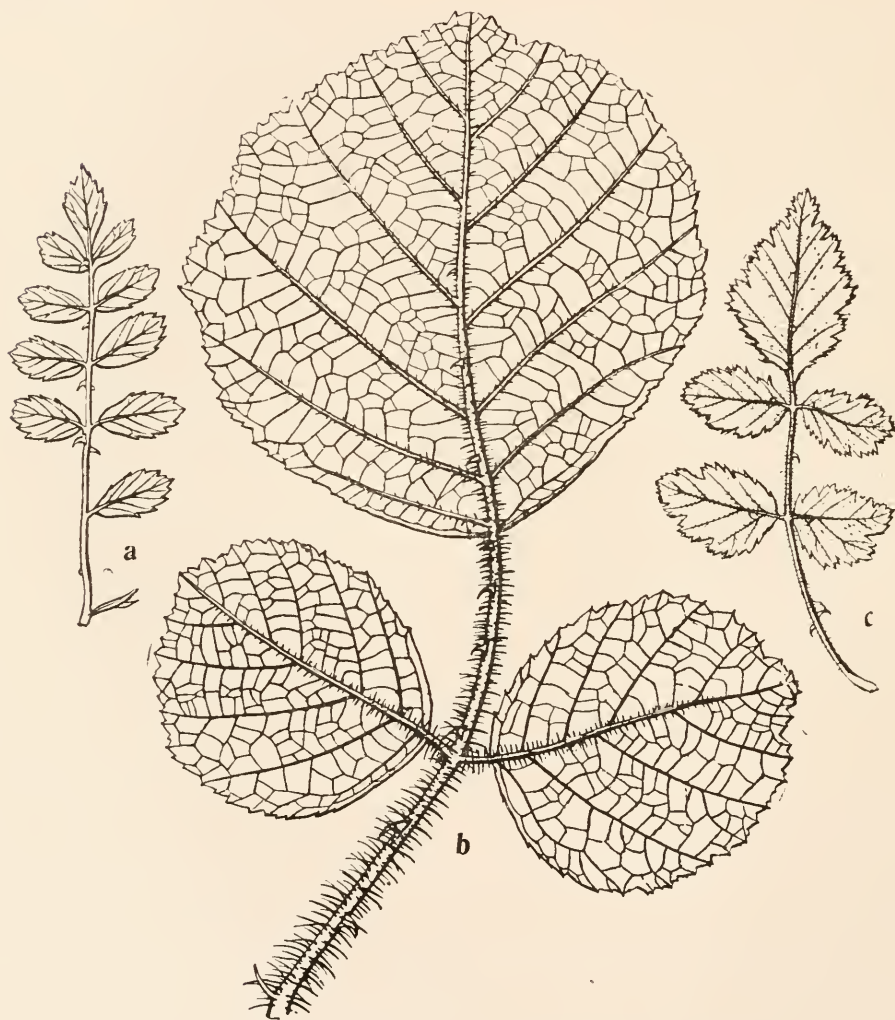


Fig. 13; a, *Rubus elegans* HAY.; b, *Rubus fasciculatus* DUTHIE;  
c, *Rubus glanduloso-calycinus* HAY.

11. **Rubus Somai** HAYATA sp. nov. (Fig. 14-a) Suffrutex spinosus. Ramuli græiles teretes fulvo-rubescentes flexuosi spinosi et tenuiter villosi, pilis fulvo-rubescensibus apice glanduliferis. Folia alterna pinnata in ambitu ovata cum petiolis 15-20 cm. longa 10-13 cm. lata 5-foliolata rarius 3-foliolata, foliolo terminali maximo ovato-oblongo vel ovato-lanceolato 6-8 cm. longo 2-3 cm. lato apice acuminato basi rotundato duplicato-serrulato supra minus subtus plus velutinoso subtus ad costam minute remoteque aculeolata, petiolulo terminali 1-2 cm. longo, foliolis lateralibus ovato-lanceolatis infimis majoribus quam foliolo terminali et superioribus minoribus oppositis, jugis a se 2-3 cm. remotis; rachis foliorum glanduloso-hirsuta spinosa supra sulcata, spinis recurvis 1-2 mm. longis, petiolis communibus 2-5 cm. longis, stipulis inferiore adnatis superiore linearibus hirsutis. Calyx-cupula circ. 8 mm. in diametro intus ad centrum villosa caeterum glabra extus hirsuta; calycis lobi cum cuspidibus  $1\frac{1}{2}$  cm. longi 5 mm. lati oblongo-triangulares apice longe cuspidati, cuspidibus linearibus 5 mm. longis, utraque velutinosi basi haud vel vix contracti margine integri. Petala non satis nota extus hirsuta basi breve unguiculata. Stamina  $\infty$ , antheris ellipticis 1 mm. longis apice emarginatis basi 2-lobatis. Receptaculum fructus ellipsoideum 6 mm. longum 3 mm. latum hirsutum. Pseudosyncarpium oblongum 7 mm. latum. Achæ-nium semioblongum latere complanatum 2 mm. longum 1 mm. latum ruguloso-reticulatum apice dorso hirsutum.

HAB. Banhoryō, leg. T. SōMA, Mart. 1914, No. 917.

Near *R. piptopetalus* HAYATA; but differs from it in having hirsute carpels.

12. **Rubus dolichocephalus** HAYATA (Fig. 14-b) Ic. Pl. Formos. III. p. 92.

NOTE: petals white; pistils fresh-green; fruits reddish-yellow; carpels botryoidal at the tip.

13. **Rubus euphlebophyllus** HAYATA (Fig. 14-c) Ic. Pl. Formos. V. p. 44.





FIG. 14; a, *Rubus Somai* HAY.; b, *Rubus dolichocephalus* HAY.;  
c, *Rubus euphlebophyllus* HAY.

14. **Rubus piptopetalus** HAYATA (Fig. 15-a) Ic. Pl. Formos. V. p. 51.

15. **Rubus sphaerocephalus** HAYATA (Fig. 15-b); Ic. Pl. Formos.

III. p. 94.



Fig. 15; a, *Rubus piptopetalus* HAY.; b, *Rubus sphaerocephalus* HAY.

16. **Rubus linearifoliolus** HAYATA sp. nov. (Fig. 16-a) Suffrutex scandens. Ramuli recti teretes glanduloso-viscosi fulvo-rubescences aculeati aculeis rectis 3-4 mm. longis complanatis acuminatis recto-patentibus. Folia pallido-viridia pinnata in ambitu lanceolata cum petiolo 20-25 cm. longa 10-15 cm. lata, foliolo terminali lineari-lanceolato 5-6 cm. longo 8 mm. lato apice acuminato basi obtuso margine duplicato-serrulato utraque glabro, costa subtus aculeolata supra laevi, foliolis lateralibus eo terminali conformibus oppositis 3-5 jugis a se 3-4 cm. remotis, petiolis cum rhachibus glabris sed viscosis aculeatis, aculeis deorsum recurvis, stipulis usque ad medium ad petiolum adnatis linearibus 5 mm. longis. Racemi pauciflorati, floribus 1-2, axillares vel terminales, pedunculis vel pedicellis 1-2 cm. longis viscosis plus minus aculeo latis. Calyx pallido-viridis; calycis cupula extus glabra sed viscosa 7 mm. in diametro ad centrum plus minus depressa; calycis lobi triangulares 6 mm. longi 4-5 mm. lati apice acuti subito ad acumen linearem 7 mm. longum abeuntes extus viscosi prope marginem hirsuti intus villosi. Petala alba obovato-rotundata 12 mm. longa 8-9 mm. lata apice rotundato-truncata basi obtusa vel plus minus cuneata margine subintegra versus apicem plus minus crenulata vel integra. Stamina  $\infty$ , antheris ellipticis 1 mm. longis  $\frac{1}{2}$  mm latis utroque emarginatis. Cupula intus glabra ad centrum villosa. Receptaculum ellipsoideum. Ovarium oblique oblongum, stylo glabro, stigmate terminali.

HAB. inter Nanko et Dainanō, leg. B. HAYATA, Mai. 1916.

Near *R. rosaeifolius* Sm., but differs from it by the linear leaflets.

17. **Rubus triphyllus** THG. (Fig. 16-b); KOIDZ. Conspect. Ros. Jap. p. 137. *R. parvifolius* MIQ.; MATSUM. et HAYATA Enum. Pl. Formos. p. 122.

Note: petals purple.



Fig. 16; a, *Rubus linearifolius* HAY.; b, *Rubus triphyllus* THUNB.

18. **Rubus parvi-araliifolius** HAYATA (Fig. 17) Ic. Pl. Formos. V. p. 48.



Fig. 17; *Rubus parviaraliifolius* HAY.



19. **Rubus rarissimus** HAYATA (Fig. 18) Ic. Pl. Formos. VI. p. 16.



Fig. 18; *Rubus rarissimus* HAY.

20. **Rubus taiwanianus** MATSUM. (Fig. 19-a) in MATSUM. et HAYATA Enum. Pl. Formos. p. 123.

21. **Rubus parvipungens** HAYATA (Fig. 19-b) Ic. Pl. Formos. V. p. 56. *R. hirsutopungens* HAYATA Ic. Pl. Formos. V. p. 58.

22. **Rubus glandulosopunctatus** HAYATA (Fig. 19-c) Ic. Pl. Formos. IV. p. 5.

23. **Rubus parvirosaefolius** HAYATA (Fig. 19-d) Ic. Pl. Formos. V. p. 54.



Fig. 19; a, *Rubus taiwanianus* MATSUM.; b, *Rubus parvipungens* HAY.; c, *Rubus glandulosopunctatus* HAY.; d, *Rubus parvirosaefolius* HAY.

24. **Rubus kotoensis** HAYATA (Fig. 20) Ic. Pl. Formos. III. p. 90.



Fig. 20; *Rubus kotoensis* HAY.

25. **Rubus fraxinifoliolus** HAYATA (Fig. 21) Ic. Pl. Formos. V. p. 46.



Fig. 21; *Rubus fraxinifoliolus* HAY.

Note : Climbing glabrous shrub ; leaves dark-green ; calyx green ; petals white ; anthers dark-brown.

26. **Rubus fraxinifolius** POIR. (Fig. 22-a) ; MATSUM. et HAYATA Enum Pl. Formos. p. 121.

27. **Rubus parvifraxinifolius** HAYATA (Fig. 22-b) Ic. Pl. Formos. V. p. 52.



Fig. 22, a, *Rubus fraxinifolius* POIR.; b, *Rubus parvifraxinifolius* HAY.



*Photinia* LINDL.***Photinia daphniphyloides***

HAYATA sp. nov. (Pl. IV. et Fig. 23).  
 Frutex 10–15 ped. altus dense ramosus; ramulis validiusculis primum tomentosus lamum glabris. Folia alterna oblonga coriacea glabra 14 cm. longa 6 cm. lata apice subito cuspidato-acuta ad summum breve aristata basi obtusa vel obtusotruncata margine integra, costa supra impressa subtus elevata, venis lateralibus primariis utroque latere costæ 15–16 gracillimis supra laud subtus tenuiter elevatis, vcnulis gracillimis subtus elevato-reticulatis, supra nitida atroviridia subtus glaucescentia, petiolis 3 cm. longis hirsutis. Flores cymoso-paniculati, paniculis terminalibus 7 cm. longis totiusque latis, pedunculis et ramis tomentosus apice dense floratis, pedicellis glabris 2–4 mm. longis. Calyx extus glaber obconicus vel obcampanulatus 1 mm. longus 3 mm. latus 5-lobatus, lobis semi-rotundatis  $\frac{2}{3}$  mm. longis 1 mm. latis apice rotundatis coriaceis margine membranaceis integris. Petala 5 alba late rotundata  $2\frac{1}{3}$  mm. longa totiusque lata apice rotundata basi breve unguiculata. Stamina 13–15 ad basin lorum calycis affixa, filamentis glabris, antheris rotundato-

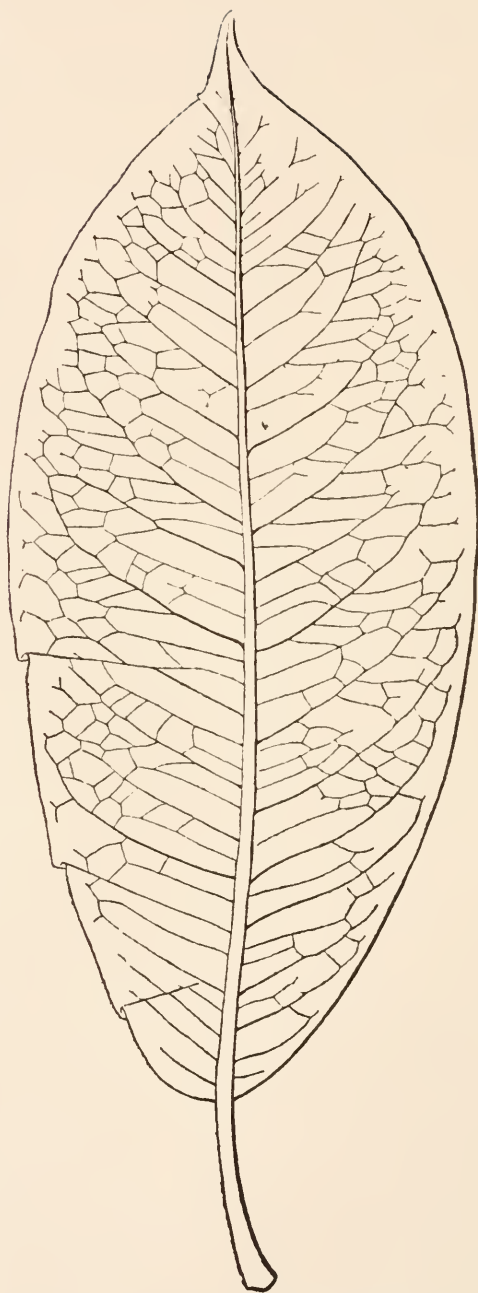


Fig. 23, *Photinia daphniphyloides* HAYATA.

reniformibus  $\frac{1}{2}$  mm. in diametro. Ovarium apice conicum liberum dense albo-barbatum 2-loculare, loculis 2-ovulatis.

HAB. Inter Shingiō et Batakan, leg. S. SASAKI et B. HAYATA, Aprili. 1917.

Comparable to some extent to *P. integrifolia*, but differs from it by the villose carpels.

## Caprifoliaceæ.

### *Abelia* R. BR.

***Abelia ionandra*** HAYATA sp. nov. (Pl. V.)=*A. chinensis* HAYATA Mater. Fl. Formos. p. 138 (non R. BR.). Frutex 1-2 m. altus; rami cinerascens graciles teretes, cortice longitudinaliter fissis, ramulis gracillimis rectis toto foliatis rubescentibus brevis pubescentibus. Folia opposita rhomboideo-ovata 2 cm. longa  $1\frac{1}{2}$  cm. lata apice triangulari-acuta basi rotundato obtusa margine minute remoteque mucronibus utroque latere 5-6 instructa apice mucronata, costa supra impressa subtus elevata, supra viridia subtus pallidissima, venulis reticulatis. Cymae 2-floratae versus et ad apicem ramulorum quasi-fasciculatim aggregatim dispositae; pedunculi vel pedicelli 4-5 mm. longi hirsuti medio bracteis oppositis 2 instructi, (bracteis hirsutis spathulatis  $1\frac{1}{2}$ -2 mm. longis concavis apice obtusis basi haud contractis) apice bracteis 6 radiatim dispositis instructi, bracteis  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice obtusis margine ciliatis. Flores geminatim ad apicem pedicelli cymae dispositi sessiles. Ovarium inferum (vel tubus calycis) 6 mm. longum ovato-fusiforme hirsutum  $1\frac{1}{2}$  mm. latum multi-sulcatum. Limbus calycis 5-partitus, partibus patentibus aequalibus 4-6 mm. longis 1-2 mm. latis spathulatis apice obtusis basi attenuatis margine integris coliolatis pallido- viridi-flavis chartaceo-membranaceis nervosis, nervis dorso elevatis plus minus hirsutis. Corolla longe tubulosa versus apicem campanulata 13 mm. longa, limbo 6 mm. lato, tubo medio  $1\frac{1}{2}$  mm. lato apicem gradatim ad limbum abeunti, extus tenuiter hirsuta intus dense hirsuta fere regularis vel plus minus 2-labiata, labio superiore 2-lobato, lobis semirobundatis  $1\frac{1}{2}$  mm. longis 2 mm. latis apice rotundatis margine integris ciliolatis, labio inferiore 3-lobato, lobis lateralibus cum lobo labii superioris conformibus, lobo medio

plus minus longiore oblongo  $2\frac{1}{2}$  mm. longo  $2\frac{1}{3}$  mm. lato apice rotundato basi haud contracto margine glanduloso-ciliolato, lobis totis reticulato-nervosis. Stamina 4 exserta versus basin corollae affixa, partibus liberis filamentorum 10 mm. longis glabris, antheris ellipsoideis  $1\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm. latis utroque emarginatis glabris purpureis. Stylus inclusus 10 mm. longus glaber erectus apice late campanulatus  $\frac{2}{3}$  mm. latus.

HAB. Inter Busegan et Seisui, leg. B. HAYATA et S. SASAKI, Mai. 1917.

Near *Abelia Aschersoniana* and *A. chinensis*; but differs from the former by the much larger leaves, and from the latter by the quite obtuse and shortly apiculate, but never acuminate, leaves.

## Rubiaceæ.

### *Nertera* BANKS et SOL.

***Nertera nigricarpa*** HAYATA (Pl. VI.) Fl. Montana Formos. p. 115.

HAB. Bonbonsia, leg. B. HAYATA, Mai. 1917.

Near *Nertera depressa* BANKS et SOL. (Bot. Mag. t. 5799); but differs from it by the entire corolla-lobes and black fruits.

### *Galium* LINN.

***Galium Morii*** HAYATA sp. nov. (Fig. 24) Caulis ascendens 5 cm. altus toto foliatus glaber vel inferne sparse pilis retosis conspersus, internodiis superioribus longioribus 8 mm. longis, inferioribus brevioribus 2 mm. longis. Folia inferiora minora 1 mm. longa, superiora majora 3 mm. longa 4-quasiverticillata, superiora majora oblonga  $3\frac{1}{2}$  mm. longa  $2\frac{1}{2}$  mm. lata apice apiculato-acuta basi obtusa haud petiolata sessilia margine integra 3-nervia, nervis supra elevatis ad nervos pilis setuliformibus parce conspersa, nervis subtus haud elevatis. Cyma pauciflorata fere terminalis; fructus reniformis setulis uncinatis superiore interiore recurvis conspersus.

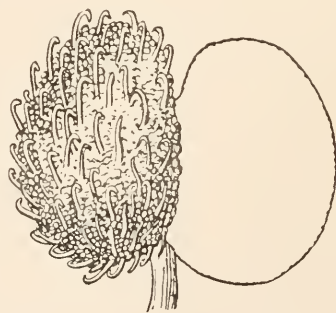


Fig. 24, *Galium Morii* HAYATA.

HAB. Mt. Morrison, leg. U. Mori, Dec. 1908. Remarkable for its small form with rounded leaves and stipules.

**Galium tarokoense** HAYATA sp. nov. (Pl. VII.) Herba glabra 8 cm. alta. Caulis decumbens vel ascendenti-erectus aggregatim situs basi ramosus toto foliatus. Folia cum stipulis quasi-4-verticillata rhomboideo-oblonga cum petiolis 1 mm. longis 6 mm. longa 2 mm. lata apice triangulari-obtusa basi subito attenuata petiolum 1 mm. longum  $\frac{1}{3}$  mm. latum formantia margine integra tenuiter deorsum recurva chartacea costa, supra distincte tenuiter elevata subtus haud elevata; nodi caulis ad basin petiolorum plus minus pilis setuliformibus instructi; internodiis 6 mm. longis. Cymae 3-5-floratae axillares vel terminales glabrae; pedicellis ultimis 1 mm. longis. Calycis lobi 0. Corolla rotata 4-partita, partibus valvatis triangulari-oblongis  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice acutis basi haud vel leviter contractis utraque glabris; parte corollae centrali non partita  $\frac{1}{2}$  mm. in diametro. Stamina 4 ad limbum inter lobos affixa, filamentis  $\frac{1}{2}$  mm. longis glabris, antheris oblongis. Stylus brevissimus 2-partitus. Ovarium globoso-reniforme dense setulis superiore recurvis conspersum.

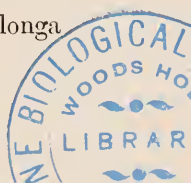
HAB. inter Shinjō et Batakan, leg. S. SASAKI et B. HAYATA, Aprili. 1917.

Larger than the preceding species from which this is distinguishable by the quite glabrous, more or less petiolate leaves.

## Ebenaceæ.

### *Diospyros* LINN.

**Diospyros Sasakii** HAYATA sp. nov. (Pl. VIII.). Arborescens 20 ped. alt. Ramuli graciles fusco-purpurascens teretes lenticellis minutis conspersi. Folia alterna membranacea lanceolata vel ovato-lanceolata 9 cm. longa 3 cm. lata apice acuminata basi acuta vel rotundata margine subintegra, costis venis venulis supra leviter impressis subtus leviter elevatis tenuibus, venis lateralibus gracillimis, reticulis subtus distincte visis, toto glabra, petiolis 1 cm. longis glabris gracilibus intus sulcatis. Flores ♂ breve racemosi, racemis 4-5 floratis ad summum 1 cm. longis glabris, pedicellis 2-5 mm. longis glabris. Calyx late obconicus viridis alte 4-lobatus extus glaber, lobis oblongo-triangularibus  $2\frac{1}{2}$  mm. longis 2 mm. latis apice obtusis basi haud contractis margine integris extus glabris intus hirsutis. Corolla urceolata 6 mm. longa



3½ mm. lata extus glabra intus barbata alba apice 4-lobata, lobis intus rubro-violascentibus late rotundatis 1¼ mm. longis 2 mm. latis apice rotundatis ad centrum leviter sinuatis basi plus minus contractis extus glabris intus barbatis. Stamina 14-16 basi corollae affixa, filamentis brevibus plus minus barbatis, antheris lanceolatis inæqualibus, longioribus 3 mm. longis, brevioribus 2 mm. longis ⅔ mm. latis apice acuminatis basi obtusis vel rotundatis plus minus barbatis. Rudimentum ovarii incrassatum 1 mm. longum totiusque latum 4-lobatum glabrum.

HAB. inter Batakan et Uchitaroko, leg. S. SASAKI et B. HAYATA, Aprili. 1917.

Near *D. Morrisiana* HANCE (BENTH. Fl. Hongk. p. 210); but differs from it by the notched lobes of the corolla.

## Euphorbiaceæ.

### *Euphorbia* LINN.

***Euphorbia tarokoensis*** HAYATA sp. nov. (Pl. IX.) Herba toto glabra annua basi suffrutescens circ 30 cm. alta. Caulis erectus rectus teres glaber pallido-viridis simplex haud ramosus (excepta inflorescentia), basi haud-foliatus a basi sursum usque ad apicem foliatus. Folia alterna approximativ sita sessilia linearia 4-5 cm. longa 3-4 mm. lata versus apicem latiora quam basi apice obtusissima rotundata sed ad centrum apicis brevissime apiculata basi obtusa toto glaberrima margine integerrima tenuissime deorsum recurva, costa supra leviter impressa subtus prominente elevata. Cymæ ad folia superiora axillares et terminales paniculam pyramidalem formantes, paniculis 10-13 cm. longis 8-10 cm. latis; cymis longe pedunculatis, pedunculis 3-4 cm. longis rectis ascendentibus vel patentibus apice furcatim 2-ramosis, ramis apice involucri florum 2 gerentibus, ad ramificationem bracteis 2 instructis, bracteis ordinis primarii rhomboideis vel reniformibus 8-10 mm. longis, 5-10 cm. latis oppositis; bracteis ordinis secundarii semper reniformibus 6 mm. longis 8 mm. latis apice breve apiculatis. Involuerum sessile vel brevissime pedicellatum urceolato-campanulatum extus glabrum 1½ mm. longum 2 mm. latum ad orem glandis 4 instructum, glandis semi-oblongis latere exteriori truncatis denticulato-crenulatis crassiusculis; lobi involucri glandis alterni



interiore recurvi semi-rotundati  $\frac{1}{2}$  mm. longi  $\frac{1}{2}$  mm. lati margine hirsuti. Fl ♂ 10–15 in involnro inclusi, stamina 1, filamentis  $\frac{1}{4}$  mm. longis, antheris reniformibus basi apiceque 2-lobatis; bracteis inter stamina laciniatis. Ovarium longe stipitatum exsertum globosum trilobum, stylis trifidis, segmentis 2-ramosis.

HAB. inter Batakan et Uchitaroko, leg. B. HAYATA et S. SASAKI, Aprili. 1917.

Comparable to some extent to *Euphorbia pekinensis*, but differs from it by the much smaller form with perfectly entire leaves and denticulate glands on the involucre.

## Urticaceæ.

### *Ficus* LINN.

**Ficus kaukauensis** HAYATA sp. nov. Arbor. Rami et ramuli cinereo-rubrescentes cicatricibus foliorum rotundatis et cicatricibus stipularum annuliformibus remote notati, cortice longitudinaliter rugoso, lenticellis laud manifestis. Folia alterna obovato-oblonga vel oblonga 11–16 cm. longa 6–10 cm. lata apice breve acuminata vel breve cuspidata basi versus extremitatem subito cuneata margine integra vel subintegra coriacea utraque; glabra, costis venisque supra tenuiter elevatis vel rarius impressis subtus distincte elevatis rubro-coloratis venis lateralibus primariis utroque latere costæ 7–8 arcuatis sursum furcatis, petiolis 2–2 $\frac{1}{2}$  cm. longis teretibus glabris supra tenuiter sulcatis; stipulis caducis ovato-lanceolatis 3 cm. longis 1 cm. latis apice acuminatissimis basi subtruncatis. Receptaculum florum galliferorum versus apicem ramorum lateraliter solitariter vel geminatim dispositum depresso-globosum circ. 2 cm. in diametro 14 mm. longum apice plus minus convexum basi depressum circ. 10–costatum fulvescens minute verrucoso-lenticellatum basi bracteis 3 instructum, bracteis brevissimis 1 $\frac{1}{3}$  mm. longis circ. 3 mm. latis late triangularibus apice subrotundatis vel obtusis; bracteis circum orem apicis receptaculi semi-rotundatis multis imbricatis. Flores galliferi longe stipitati vel sessiles; perianthia subgamophylla ad ovarium arete adnata et id includentia membranacea. Ovarium oblique obovoideum 1 $\frac{1}{2}$  mm. longum, stylo laterali ascendenti 1 mm. longo, stigmate truncato.

HAB. Kaukaukei, leg. B. HAYATA, Mai. 1916.

Near *F. Konishii* HAY., but separable from it by the leaves which are obovate with very cuneate base.

**Ficus ochobiensis** HAYATA sp. nov. Arbor. Rami crassiusculi, ramulis rubro-purpurascentibus. Folia oblonga chartacea vel chartaceo-membranacea 10–13 cm. longa 4–6 cm. lata apice breve cuspidata ad summum obtusa basi acuta vel cuneata margine subintegra a medio deorsum integra a medio sursum obscure undulata plana, præsertim sub cuspidibus manifeste repanda, vel toto subintegra supra haud nitida subtus pallida, costis venis supra subplanis haud distinctis subtus tenuiter elevatis rubro-coloratis manifeste distinctis, venulis reticulatis subtus distincte visis, venis lateralibus primariis utroque latere costæ 6–7 arcuatis sursum furcatim ramosis, utraque pagine glaberrima, petiolis 7–15 mm. longis sparse hirsutis, stipulis caducis ovatis vel elongato-ovatis 18 mm. longis 8 mm. latis apice acutis basi truncatis. Receptaculum depressoglobosum (immaturum?) ad ramos vel truncos glomeratim dispositum stipite 3 mm. longo instructum 12 mm. longum 7 mm. latum plus minus verrucosum vel læve apice depressum basi convexum basi bracteis 3 instructum, bracteis late triangularibus connatis peltati triangularem 6 mm. in diametro formantibus apice obtusis margine subintegris vel minute denticulatis vel ciliolatis; bracteis circum orem  $\infty$ -seriatim dispositis triangularibus vel oblongis margine ciliolatis.

HAB. Ōchōbi, leg. B. HAYATA, Mai. 1916.

Near *F. Konishii* HAY., but differs from it in having leaves with much acuter base. Also comparable to *F. Harlandi*, but distinguishable from it in having much thinner leaves with more or less cuspidate tip. Also near *F. fistulosa* REINV. (KING. t. 150) by the leaves with much narrower base.

**Ficus tannoensis** HAYATA sp. nov. Suffrutex humilis a basi ramosus, ramis teretibus gracillimis simplicibus vel paucè ramosis scandentissimis generaliter haud ramulosis rubro-purpurascentibus longitudinaliter rugulosis, cortice tenuissimo longitudinaliter fissis et soluto fere toto longitudine foliosis, 30–100 cm. longis 1–2 mm. in diametro sectionis. Folia linearia  $2\frac{1}{2}$ –10 cm. longa  $2\frac{1}{2}$ –9 mm. lata apice acuminatissima basi obtusa vel truncata vel auriculato-dilatata margine integra, supra in exsicco fusca subtus pallida

utraq̃ue pagine subglabra vel supra sparce hirsuta subtus sub lente minute atro-punctata, costis venis utraq̃ue vix vel haud elevatis, venis supra haud visis subtus distincte visis, tenuiter 3-nervia, nervis lateralibus tenuissimis brevissimis subrectis a costa angulo  $45^{\circ}$  egressis prope marginem subito sursum arcuatis, venis lateralibus utroque latere costę circ. 20 vel plus numerosis a costa angulo  $90^{\circ}$  divaricatis prope marginem venis marginalibus connexis, venis marginalibus a margine  $\frac{1}{2}$ –1 mm. distantibus, petiolis subteretibus  $\frac{1}{2}$ –8 mm. longis hirsutis, stipulis castaneis membranaceis lineari-lanceolatis 2–7 mm. longis acuminatis glabris caducissimis basi dilatatis caulem semi-amplectantibus; folia interdum anomala obovato-cuneata 1 cm. longa obscure 3-lobata. Receptaculum solitarium axillare stipitatum, stipite 3–5 mm. longo. Receptaculum (floribus galliferis et masculinis) subgloboso-urceolatum 13 mm. longum 12 mm. latum laeve glabrum basi 3-bracteatum, bracteis late triangularibus  $1\frac{1}{2}$  mm. latis minus quam 1 mm. longis apice obtusis margine ciliolatis; receptaculum apice urceolato-depressum, bracteis circum orem elevato-convexo-dispositis  $\infty$ -seriatis triangulari-rotundatis 2 mm. latis  $1\frac{1}{2}$  mm. longis haud costatis minute ciliolatis. Flores galliferi sessiles vel stipitati, perianthia 4-partita, segmenta linearia atro-castanea  $2\frac{1}{2}$  mm. longa  $1\frac{1}{2}$  mm. lata apice acuta; ovarium oblique globosum minus quam 1 mm. in diametro, stigma laterale. Flores masculini, staminibus 1–3, perianthiis 4-partitis, antheris 2-loculatis oblongis  $1\frac{1}{4}$  mm. longis minus quam 1 mm. latis utriusque emarginatis, filamentis  $\frac{2}{3}$  mm. longis.

HAB. Tanno, leg. B. HAYATA, Mai. 1916.

Very distinct for the very slender scandent habit of the species.

## Cupuliferæ.

### *Quercus* LINN.

**Quercus Sasakii** KANEHIRA (Pl. X.) in HAYATA Ic. Pl. Formos. VI. p. 64.

**Quercus spinosa** A. DAVID var. **Miyabei** HAYATA n. v. *Quercus Miyabei* KAWAKAMI in lit. Frutescens. Ramuli fusco-purpurascens parce lenticellati versus summum stellato-tomentosi dense foliati validiusculi. Folia coriacea ellipsoidea rarius obovato-ellipsoidea  $5\frac{1}{2}$  cm. longa  $3\frac{1}{2}$  cm. lata apice rotundata basi leviter cordata margine integerrima vel remote spinosa, costa

supra leviter elevata subtus prominente elevata, venis primariis lateralibus utroque latere costae 7, mediis  $50^\circ$  infimis  $90^\circ$  a costa egressis subtus elevatis, supra glabra subtus ad basin costae stellato-tomentosa caeterum glabra, petiolis brevissimis 5 mm. longis plus minus tomentosus. Cupula.....

HAB. in montibus centralibus, leg. U. MORI, Dec. 1909.

The species was first named as *Quercus Miyabei* by the late T. KAWAKAMI, but the name was not published, as it was then considered to be identical with *Quercus spinosa* DAVID. In examining again the species and in comparing it closely with *Q. spinosa*, I have found that there are some difference between the two. The leaves of the present *Quercus* are usually elliptical or very slightly obovate-elliptical, while those of *Q. spinosa* are always obovate. Moreover, the leaves of the former are nearly plain on the upper surface, while those of the latter are very much impressed on the costas and lateral veins. For this reason, it would be better to regard the Formosan species as a variety of *Q. spinosa*.

**Quercus tarokoensis** HAYATA sp. nov. (Pl. XI.). Arbor. Rami pallidocinerascentes vel purpurascetes minute lenticellati, ramulis gracilibus fulvostellato-tomentosis foliatis. Folia variabilissima coriacea vel chartacea subdecidua elliptica ovata vel oblonga 3-4 cm. longa 2-2½ cm. lata apice obtusa acuta vel acutissima basi leviter cordata margine aristato-serrulata, serrulis erecto-ascendentibus apice aristis instructis, aristis ascendentibus 1 mm. longis interiore recurvis, pagine utraque glabra ad costas sparse stellato-hirsuta, venis primariis lateralibus utroque latere costae 7-8 mediis  $50^\circ$  infimis  $90^\circ$  a costa egressis rectis apice ad serras attingentibus, petiolis 3 mm. longis stellato-tomentosis, stipulis caducissimis lineari-spathulatis 7 mm. longis 1½ mm. latis apice obtusis basi attenuatis. Amentum floris ♂ gracile pendulum 3 cm. longum stellato-hirsutum a supra basin remote floratum. Perianthium late obconicum 2-3-lobatum extus hirsutum intus glabrum 1½ mm. longum. Stamina 4-5, filamentis 2½ mm. longis glabris, antheris linearibus 1 mm. longis ¼ mm. latis. Cupula disciformis 12 mm. in diametro 3 mm. alta extus squamis multi-seriatim instructa, squamis triangularibus ½ mm. longis ⅔ mm. latis apice obtusis imbricatis adnatis adpresse hirsutis, intus adpresse sericeo-hirsuta ad centrum cicatricibus glandis notata, cicatricibus 5

mm. in diametro. Glans glabra ovoideo-globosa  $1\frac{1}{2}$  cm. longa 13 mm. lata apice stigmatē apiculata basi rotundata, cicatricibus 5 mm. in diametro.

HAB. Batakan, leg. S. SASAKI et B. HAYATA. Comparable to some extent to *Quercus spinosa* DAVID, but differs from it by the acuter, smaller, thinner and less wrinkled leaves.

## Coniferæ.

### *Juniperus* LINN.

#### *Juniperus formosana* HAYATA Fl. Mout. Formosa p. 209 var. **concolor**

HAYATA n. v. (Fig. 25). Frutex erectus, ramis ascendentibus vel pendulis rubro-purpurascens rugosissimis, ramulis gracilibus toto foliatis trigonis ad angulos canalibus resiniferis teretibus instructis facie glabris ad nodos trifoliatis, internodiis 2 mm. longis. Folia linearia 17 mm. longa 2 mm. lata apice acuminata aristata basi haud contracta basi intus callis pulviniformibus singulis instructa ad nodos ramulorum ternatim verticillata ascendente vel patente, extus costis elevatis convexis intus leviter concavis, partibus stomatiferis utroque latere costæ  $\frac{2}{3}$  mm. latis, partibus non-stomatiferis  $\frac{1}{3}$  mm. latis. Fructus sessilis globosus 9 mm. in diametro apice  $\Lambda$ -forme striatus. Semina 3 oblique ovata subtrigona 6 mm. longa 3 mm. lata apice obtusa retusa ad centrum summorum breve apiculata basi rotundata facie 1- vel 2-faveolata, testa ossea.

HAB. Busegan-Seisui, leg. B. HAYATA et S. SASAKI, Mai. 1917.

Differs from the type by the leaves which are not glaucous beneath, and which have broader stomatiferous bands on the under side.

### *Podocarpus* L' HER.

*Podocarpus nankoensis* HAYATA sp. nov. Arbor, rami et ramuli ascendentes vel patentes interdum plus minus penduli graciles, cortice cineras-

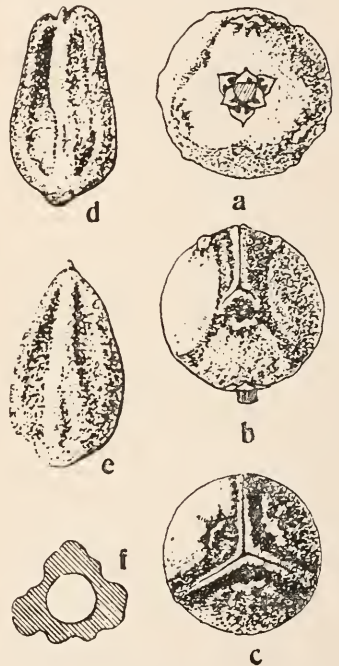


Fig. 25, *Juniperus formosana* HAY. var. **concolor** HAY.

a, a fruit; b, the same, seen from side; c, the same, seen from above; d, e, a seed, seen from different sides; f, the same, in section.



cente longitudinaliter rugoso fesso glabro. Folia opposita lanceolata ovato-lanceolata apice obtusa 6–9 cm. longa 13–25 mm. lata basi cuneato-attenuata sessilia margine integerrima utraque glabra crasso-coriacea haud costata subtus pallidiora multinervia. Fl. ♂ breve racemosi, racemis axillaribus 1 cm. longis sessilibus 4–5-floratis basi bracteis 2–3 instructis, bracteis  $2\frac{1}{2}$ –3 mm. longis triangularibus 1 mm. latis apice longe cuspidatis margine serrulatis glabris, cuspidibus validibus 1–2 mm. longis. Flores cylindrici sessiles 5–7 mm. longi glabri, staminibus 70–100 spiraliter approximatis dispositis. Stamina sessilia 2-locularia adnata, antheris oblongis 1 mm. longis introrse dehiscentibus, connectivis apice productis, partibus productis cuspidiformibus 1 mm. longis triangularibus apice acutis.

HAB. Nankō, leg. B. HAYATA, Mai. 1916.

Near *Podocarpus Nageia*, but differs from it in the much smaller male flowers with much narrower scales. Branches of this new species are somewhat drooping, while those of *P. Nageia* are spreading and ascending.

## Orchideæ.

### *Dendrobium* SEV.

***Dendrobium erythroglossum*** HAYATA (Pl. XII.) Ic. Pl. Formos. IV. p. 36.

### *Liparis* RICH.

***Liparis keitaoensis*** HAYATA sp. nov. (Pl. XIII). Terrestris, radicibus gracilibus haud incrassatis e basi pseudobulbi oriundis. Pseudobulbi annotini ovoidei plus minus complanati 4 cm. longi 2– $2\frac{1}{2}$  cm. lati apice obtuso-acuti basi rotundati haud squamati subnudi. Caulis erectus gracilis basi haud incrassatus glaber in specimine nostro cum racemo 22 cm. longus e basi pseudobulbi annotini oriundus 1-foliatus basi squamis vaginiformibus 2–3 et basi folii involutus. Folia e basi caulis oriunda petiolata, laminis cordatis 11 cm. longis 9 cm. latis apice acutis basi profunde cordatis caulem amplexantibus supra pallido-viridibus subtus pallidissimis utraque glabris margine integerrimis planis haud crispulatis crassiusculis supra subnitidis, nervis lateralibus utroque latere costæ 5–6, venulis inter nervos circ. 5 tessellato-reticulatis haud visis; laminis horizontaliter patentissimis, petiolis erectis 6 cm. longis secus longitudinem plicatis toto amplexicaulibus latere complanatis latere 1 cm. latis

glabris pallidis basi squamis 1-2 involutis, squamis vaginiformibus 3-5 cm. longis petiolum perfecte amplexantibus. Racemi glabri erecti subrecti subnudi angulato-teretes ad angulos angustissime alati laxiuscule floriferi, bracteis basi pedicelli singulis minutis latissime triangularibus 1 mm. longis 2 mm. latis apice acutis, pedicellis cum ovariis circ. 1 cm. longis angulatis pallido-viridibus transverse divaricatis. Flores virides. Sepalum posticum lineare integrum margine reflexo-convulso-recurvum 1 cm. longum basi 2 mm. latum apice obtusum basi plus minus cordatum dorso prominente carinatum glabrum; sepala lateralia plus minus obliqua quam posticum latiora. Petala angustissime linearia 1 cm. longa minus quam 1 mm. lata apice truncata margine plus minus convoluta. Labellum obovato-obtriangulare 8 mm. longum totiusque latum apice truncatum ad centrum apicis minute cuspidatum, cuspidi triangulari 1 mm. longa totiusque lata, margine denticulatum apice plus crispulatum trinervium, nervis lateralibus extrorse venulis 3-4 gerentibus, medio stria singula nitida viridissima instructum basi callis duobus instructum facie utraque læve. Columna cum operculo 4 mm. longa anteriore recurva glabra semiteres basi valde dilatata utroque latere basis auriculata, auriculis decedentibus obtusis  $\frac{1}{3}$  mm. longis, apice utroque latere anteriore alata, alis triangularibus. Anthera 2-locularis, pollinia 2.

HAB. Keitao, leg. B. HAYATA, Aprili. 1916.

Very near *Liparis cordifolia* HOOK. f. (KING and PANTLING Orchids of the Sikkim-Himalaya t. 28); but distinguishable from it in the lips which are, in this new species, nearly smooth and glabrous on the upper surface, slightly denticulate at the margin and dark green on the middle striation on the upper surface. In *Liparis cordifolia*, the lips are tuberculate on the upper surface, conspicuously denticulate at the margin and bright yellow on the middle striation.

## Liliaceæ.

### *Trillium* LINN.

**Trillium Morii** HAYATA sp. nov. (Pl. XIV.) = *Trillium Tschonoskii* HAYATA (non MAXIM.) Ic. Pl. Formos. V. p. 233. Caulis 40-50 cm. altus teres glaber inferiore 7 mm. in diametro haud ramosus simplex erectus rectus apice foliis verticillatis 3 instructus, e basi radices filiformes emittens. Folia

sessilia late rhomboideo-rotundata latiora quam longa 10 cm. longa totiusque lata apice subito cuspidato-acuta basi late cuneata vel rotundata utraque pagine glabra margine integra membranacea 3-nervia. Flores ad apicem caulis terminales 2-2½ cm. in diametro solitarii glabri pedunculati, pedunculis erectis rectis teretibus 2-3 cm. longis. Sepala 3 ovato-lanceolata 17 mm. longa 8 mm. lata apice acuminata ad summum obtusa glabra margine integra. Petala 3 ovato-oblonga 2 cm. longa 9 mm. lata margine integra apice obtusa basi plus minus contracta membranacea. Stamina 6 glabra, filamentis 5 mm. longis complanatis basi dilatatis 1 mm. latis medio ½ mm. latis, antheris adnatis linearibus 3½ mm. longis apice apiculatis. Ovarium late ovoideum 9 mm. longum 8 mm. latum apice obtusum ad stigmata trifida abeuns, ramis stigmatibus 3 mm. longis exteriore recurvis intus dense botryoideo-hirsutis, 3-loculare.

HAB. Tonkurankei, leg. U. MORI, Aprili. 1910.

Closely related to *T. Tschonoskii* MAXIM., but differs from it in the densely hirsute stigmata.

### *Allium* LINN.

***Allium morrisonense*** HAYATA sp. nov. Bulbus tunicatus ovoideo-(ampulli)-formis 15 mm. longus apice attenuatus. Folia tenuissima 30-40 cm. longa 1½ mm. lata fere filiformia glabra apice acuminata. Scapus erectus glaber rectus 45-35 cm. longus teres medio 2 mm. latus apice umbellam singulam gerens. Umbella simplex terminalis solitaria basi 2-bracteata, bracteis hyalinis ovatis apice acuminatis, radiis (pedicellis) circ. 6 gracilibus 2 cm. longis patentibus. Segmenta perianthii exteriora rotundato-oblonga 5 mm. longa 4 mm. lata apice rotunda basi contracta obtusa margine integra intus valde concava; interiora oblonga 6 mm. longa 4 mm. lata apice obtusa basi late cuneata ad basin 1 mm. lata margine plus minus eroso-crenulata vel subintegra 1-nervia. Stamina 6, 8-10 mm. longa, filamentis glabris complanatis, antheris oblongo-ovoides 2 mm. longis 1 mm. latis apice attenuatis basi cordatis. Ovarium depresso-globosum 2 mm. longum 3 mm. latum apice depressum basi stipitem 1 mm. longum abeuns.

HAB. Mt. Morrison, ad 5000 ped. alt., leg. U. MORI.

Near *Allium Bakeri*, but differs from it in having much slenderer and

longer leaves.

There is a specimen labelled as *A. Bakeri* in the herbarium at Kew, which is exactly like the present species.

## Gramineæ.

### *Conspectus of the Formosan Genera.*

*Mainly arranged after HOOKER'S system given in "Fl. Brit. Ind. VII."*

**Series A.** Panicaceæ. Spikelets articulate on their pedicels, or deciduous with them, 1-2-fl'd, upper fl. alone (if 2) fruiting.

*Exceptions* Spikelets inarticulate on their pedicels in *Arundinella* and *Isachne*. Spikelets articulate on their pedicels, or with articulate pedicels occur in *Poaceæ*, in *Alopecurus*, *Polypogon* and *Lophatherum*. Upper flower alone fertile in **TRIBE PHARAIDEÆ** of *Poaceæ*, and in *Tristachya*.

**I.** Rachis of infl. inarticulate. Fl. gl. usually coriaceous or herbaceous.

**TRIBE I. PANICEÆ.** Spikelets 1-2-fl'd., if 2, upper fl. bisexual, lower male or neuter, rarely both fertile (*Spinifex* is dioecious).

\* Spikelets articulate on their pedicels, except *Isachne* and *Arundinella*.

† Spikelets not involuclate by bristles.

§ Spikelets not awned (gl. II. and III. beaked or awned in *Pan. Crus-Galli*). (See also *Arundinella*).

Spikelets 1-fl'd. dorsally flattened, base not thickened; gls. 3. 1. *Paspalum*.

Spikelets of *Paspalum* 1-fl'd., but with a thickened basal callus, panicle. 2. *Eriochloa*.

Spikelets 2-fl'd. subglobose, panicle; outer empty glumes 2 nearly equal; both the flg. gls. as well as the palcæ, of a firmer texture, all awnless.

3. *Isachne*.

Spikelets of *Isachne*; but 1-fl'd., gls. 4, outer glumes very deciduous; flg. gl. membranaceous.

4. *Sphaerocaryum*.

Spikelets 1-fl'd. panicled or spicate, gls. 4: I and II very rarely subequal, II and III awned in *P. Crus-Galli*, IV rarely very shortly awned.

5. *Panicum*.

Spikelets dorsally flattened, on one side of slender spikes, gls. 4, or the first entirely reduced; others like *Panicum*

6. *Digitaria*.

Spikelets of *Panicum*, but gl. IV narrowed into a short, flattened stipe.

7. *Ichnanthes*.

Spikelets innumerable, very minute, densely crowded in the capillary branches of a very large panicle; gl. IV setaceous hairy on the marginal costae.

8. *Thysanolaena*.

Spikelets panicled, branches of panicle produced beyond the uppermost spikelets; gl. I minute, hyaline.

9. *Chameraphis*.

Diœcious, male spikelets in clustered spikes, fem. solitary; a stout grass, leaves setiformed.

10. *Spinifex*.

§§ Spikelets awned, except in some sp. of *Arundinella*.

Spikelets solitary or fascicled on a simple rachis or the branches of a panicle; gl. I long awned.

11. *Oplismenus*.

Spikelets of *Panicum*, but marginal nerves of gl. II barbate, and palea of III deeply cleft, IV awned.....

12. *Axonopus*.

Spikelets persistent on the pedicels, or gls. I and II separately deciduous, IV deciduous; usually awned, awn bent.

13. *Arundinella*.

†† Spikelets each surrounded by an involucl of bristles.

14. *Setaria*.



\*\* Spikelets persistent on their pedicels, at least the fertile, or deciduous with their pedicels.

† Spikelets in involucentled deciduous fascicles.

15. *Pennisetum*.

†† Spikelets not involucentled.

16. *Thuarea*.

TRIBE II. ORYZEÆ. Spikelets 1-fl., articulate on their pedicels and deciduous from them. Palea 1-3 nerved, stamens 6.

Spikelets 2-sexual, awned or not; gl. 4, I and II minute or setaceous.

17. *Oryza*.

Spikelets 2-sexual, awnless; gls. 2, broad, thin.

18. *Leersia*.

Spikelets 1-fl., unisexual narrow. Panicles long abundantly floriferous androgynous; gls. 2, Stamens 6.

19. *Zizania*.

TRIBE III. ZOYSIÆ. Spikelets 1-fl., deciduous with their pedicels, 2-sexual, or some imperfect.

Spike very slender; spikelets narrow, gl. I and II awned.

20. *Perotis*.

Spike rigid; spikelets appressed to the rachis, not awned.

21. *Zoysia*.

II. Rachis of inflorescence usually articulate (except *Apluda*).

TRIBE IV. ANDROPOGONEÆ. Spikelets usually 2-nate, or the terminal in the infl. 3-nate, pairs homo- or heterogamous. Fl. gl. smaller than the empty, hyaline, often awned or reduced to an awn.

*Subtribe* I. *Maydeæ*. Spikelets spicate, all 1-sexual; male spikes in terminal panicles, or continuous with fem. spike.

Fruiting spikelets enclosed in a stony, nut-like polished bract.

22. *Coix*.

Fruiting spikelets enclosed in leafy bracts.

Female spikelets densely crowded on a cylindric

spongy rachis, grain exposed. 23. *Zea*.

Female spikelets sunk in alternate cucullate dilatation of the rachis of the spike, which is hidden in the leaf-sheath; grain not exposed.

24. *Euchlaena*.

*Subtribe* II. *Dimericæ*. Spikelets homogamous, secund on a slender inarticulate rachis, 1-fl., diandrous.

25. *Dimeria*.

*Subtribe* III. *Saccharææ*. Spikelets homogamous, in compound racemes or panicles (except *Pollinia*); gl. I. not sunk in a hollow of the rhachis.

\* Rhachis not or rarely fragile.

Spikelets in a cylindrical silvery thyrsus, 1-fl., not awned. 26. *Imperata*.

Spikelets panicle, 2-nate, 1-fl., awned.

27. *Miscanthus*.

\*\* Rhachis fragile.

Spikelets in panicle racemes, 2-fl., awned.

28. *Spodiopogon*.

Spikelets in geminate digitate or fascicled spikes.

Spikelets binate, one sessile, the other pedicelled.

29. *Pollinia*.

Spikelets binate, both pedicelled.

30. *Polliniopsis*.

Spikelets in a thyrsus of spiciform racemes, 1-fl., awnless.

31. *Saccharum*.

Spikelets in a thyrsus of spiciform racemes, 1-fl., awned.

32. *Erianthus*.

*Subtribe* IV. *Ischæmææ*. Spikelets many, in solitary digitate or fascicled spikes, usually heteromorphous; gl. I not sunk in a hollow of the rachis (see *Pollinia* in *Saccharææ*).

\* Margins of gl. I of sessile spikelets inflexed.

Spikes rarely solitary; spikelets 2-nate, 2-fl.,  
awned. 33. *Ischaemum*.

Spikes solitary, spikelets 1-fl., gl. I pectinate.  
34. *Eremochloa*.

\*\* Margins of gl. I of sessile spikelets not inflexed.  
Spikes solitary; spikelets 2-nate, 1-2-fl., 2-awned.  
35. *Pogonatherum*.

Spikes digitate; spikelets 1-fl.,  
36. *Arthraxon*.

*Subtribe V. Apludeæ.* Spikelets 3 on an inarticulate  
rachis. 37. *Apluda*.

*Subtribe VI. Rottboellieæ.* Spikelets homo- or hetero-gamous,  
1-2-fl., solitary, or 2- rarely 3-nate on the internodes  
of an articulate spike or raceme, not awned, gl. I  
not keeled, adnate to or sunk in a depression formed  
by the internode and pedicel of the upper spikelets;  
gl. of sessile spikelet 4.

Spikelets 2-nate, gl. I flat. 38. *Rottboellia*.

Spikelets 2-nate, gl. I globose. 39. *Manisuris*.

Spikelets solitary, gl. I convex. 40. *Ophiurus*.

*Subtribe VII. Euandropogoneæ.* Spikelets heterogamous  
1-fl., 2- rarely 3-nate on the whorled articulate  
branches of simple or compound racemes or panicles,  
gl. 4, I not keeled, IV usually awned.

Sessile spikelets of all the pairs alike in sex and  
form throughout the spikes.

Joints of rachis and pedicels of upper spikelets  
linear, compressed, with usually a central trans-  
lucent channel and thickened margins.

41. *Andropogon*.

Joints of rachis very few, filiform, opaque;  
lodiceles ciliate; grain dorsally compressed.

42. *Sorghum*.

Joints of rachis few ; spikelets articulate on the obliquely truncate, bearded tips of the branches of the panicle.

Spikelets in threes, 1 sessile between 2-pedicellate. 43. *Chrysopogon*.

Lowest one or more sessile spikelets differing from all those above it in sex or form.

Spikes binate on the peduncle which is enclosed in a spathiform sheath ; sessile spikelet dorsally compressed. 44. *Cymbopogon*.

Spikes solitary, lower pairs of spikelets very unlike the upper ; upper sessile spikelets cylindric ; all spikelets monoecious.

45. *Heteropogon*.

Spikelets in 2 superposed series ; upper series of hetero gamous pairs, and a terminal male, lower a whorl of 4-persistent males or neuters. 46. *Themeda*.

**Series B.** Poagææ. Spikelets continuous (not articulate with) their pedicels, 1-many-fld., rachilla articulate at the base, and often between the flg. gls.; lowest fl. always fruiting, upper often male or neuter. (Exceptions. Articulate on their pedicels in *Polypogon*. Upper fl. alone bisexual in *Phalarideæ*. Spikelets articulate on their pedicels, or gl. I and II separately deciduous occur in *Alopecurus*, *Melica* : see under *Panicææ* some genera with spikelets inarticulate at the base).

TRIBE V. AGROSTIDÆÆ. Spikelets 1-fld.; rachilla jointed at the base, produced or not beyond the flg. gl.; gls. 3, I and II empty, III flg. awned. Exceptions: Spikelets sometimes 2-fld. in *Sporobolus* and *Muehlenbergia*.

*Subtribe I. Phleoideæ.* Spikelets in spiciform or subspiciform panicles, gl. III. hyaline, loosely wrapping the grain ; stigmas exerted from the top of the spikelet.

47. *Alopecurus*.

*Subtribe* II. *Euagrostecæ*. Spikelets 1-fl'd. usually small, in open or contracted many-fl'd. panicles; gls. usually thin or membranous; stigmas laterally exerted from the spikelet. (Spikelets rarely 2-fl'd. in *Sporobolus* and *Muehlenbergia*).

Spikelets articulate on their pedicels, or gl. I and II separately deciduous, or pedicel articulate in the middle. 48. *Polypogon*.

Spikelets and pedicels inarticulate, gl. I and II persistent.

Gls. all awnless; I and II 1-nerved, pericarp of grain loose. 49. *Sporobolus*.

Gls. I and II subequal, 1-nerved, awnless, awn of III dorsal or O. 50. *Agrostis*.

Gls. I and II unequal, awnless, 1-nerved, awn of III terminal. 51. *Muehlenbergia*.

Gls. I and II 3-nerved, awnless, base of III penicillate with long hairs.

52. *Calamagrostis*.

TRIBE VI. AVENÆÆ. Spikelets 2- or more fl'd., panicle, very rarely spicate, or panicle subspiciform; fl. gls. usually awned, awn geniculate and often twisted, rarely straight or O; rachilla produced or not beyond the upper fl. gl.

*Subtribe* I. *Airææ*. Spikelets 2-fl'd.; gls. membranous; rhachilla not produced. 53. *Aira*.

*Subtribe* II. *Euavenecæ*. Spikelets 2- or more fl'd., rhachilla produced.

Spikelets 2-fl'd., both bisexual, awned.

54. *Deschampsia*.

Spikelets 2-6-fl'd.; fl. gl. awned, awn subterminal or dorsal

Annual. Spikelets pendulous; gl. I and II 5-7-



nerved, ovary with a villous top. 55. *Avena*.  
Perennials. Spikelets erect. Fl. gls. 3-5-nerved,  
ovary quite glabrous. 56. *Trisetum*.

TRIBE VII. CHLORIDÆ. Spikelets 1- or more fld., 2-seriate  
(sometimes very distantly) and secund on an  
inarticulate or on the spiciform branches of a  
slender panicle; fl. all or the lower only bisexual;  
rhachilla produced or not beyond the upper fl. gl.

\* Spike solitary, terminal.

Spikelets 1-2-fld., in sessile inarticulate clusters,  
awned. 57. *Enteropogon*.

Spikelets many-fld., fl. gl. 3-awned.

58. *Tripogon*.

\*\* Spikes or spiciform, branches digitate, racemed or  
panicled.

Spikes digitate, 1-fld., upper imperfect fl. O.

59. *Cynodon*.

Spikes solitary, spicate or racemed; spikelets 2-  
or more fld., upper fl. imperfect. 60. *Chloris*.

Spikes digitate or whorled; spikelets 3-6-fld.,  
densely crowded, awnless.

Spikelets densely imbricate, pointing fore-  
wards, gl. II acute. 61. *Eleusine*.

Spikelets erect, at right angles to the rhachis  
of the spike. Glume II short, suborbicular,  
abruptly shortly awned.

62. *Dactyloctenium*.

Spikes panicled filiform; spikelets very minute,  
alternate, 1 or more fld., awnless.

63. *Leptochloa*.

TRIBE VIII. FESTUCACEÆ. Spikelets 2- or more-fld., pedicelled,  
rarely sessile, in effuse or contracted rarely spiciform,  
panicles; rhachilla articulate at the base and often

at the base of fl. gls., always produced beyond the uppermost fl. gl.

*Subtribe I. Arundineæ.* Spikelets panicle, 2-many-fl.; gls. very narrow, flg. penicillate with long silky hairs on the callus or sides or both, lowest fl. gl. sometimes male or neuter.

Rachilla elongate, glabrous; fl. gl. silkily hairy.

64. *Arundo*.

Rachilla very short; fl. gls. glabrous, callus with long silky hairs.

65. *Phragmites*.

*Subtribe II. Eragrostæ.* Infl. various. Spikelets 2-many-fl.; fl. gls. 1-3-nerved, entire, 3-toothed, 3-lobed or 3-awned.

Infl. various; spikelets many-fl.; empty gls. shorter than the lowest flg. gl., 1-nerved; flg. gls. 3-nerved; grain very minute terete.

66. *Eragrostis*.

Spikelets sessile on the spikeiform branches of a tall, broad panicle, many fl.; fl. gls. 3-4-toothed.

67. *Diplachne*.

*Subtribe III. Centothecæ.* Spikelets 1-many-fl., 1-2-seriate on the rachis of a simple spike or on the long slender branches of a simple panicle — Leaves broad, tessellately nerved.

Spikelets 1-fl., secund and articulate at the base; upper gls. empty convolute with setiform tips.

68. *Lophatherum*.

Spikelets 3- or more fl., secund, persistent; fruiting gls. with reflexed submarginal bristles, (but bristles are entirely absent in the Formosan var. *inermis*).

69. *Centotheca*.

*Subtribe IV. Eufestucæ.* Spikelets usually panicle, 2

or more-flid.; fl. gls. 5- many- (very rarely 3-) -nerved, upper empty or O; styles short (spikelets of *Brachypodium* in long very lax spikes).

Spikelets laxly panicleled, few-flid; gls. keeled, 5-nerved, awnless, nerves rarely meeting at the tip.

70. *Poa*.

Spikelets panicleled, many-flid., fl. gls. acute or awned, dorsally rounded, top of ovary naked or hairy.

71. *Festuca*.

Spikelets spicate, many-flid., mucronate or awned.

72. *Brachypodium*.

TRIBE IX. HORDEÆ. Spikelets 1 or more-flid.; sessile, 1-2 or more seriate on the rachis of a simple spike, or partially sunk in cavities of the same; rachilla usually articulate and produced beyond the flg. gls. into a naked glumiferous bristles; gls. awned or not, I and II opposite or subcollateral, persistent or separately deciduous, I sometimes absent or very minute.

*Subtribe* I. *Loliæ*. Spikelets solitary at the nodes of the spike; plane of the spikelets radial to the rachis.

Spikelets 1-2-flid., gl. I minute or O, II (or one opposite fl. glume, or in Formosan species outermost one) much longer than the hyaline III; spike cylindric, rachilla glabrous.

73. *Lepturus*.

*Subtribe* II. *Triticeæ*. Spikelets solitary at the nodes of the spike; plane of spikelets tangential to the rachis; fl. gls. 5-9-nerved, lateral nerves not conniving, short or ending in teeth or awns.

74. *Triticum*.

TRIBE X. BAMBUSEÆ. Shrubby or arboreous grasses. Leaves flat, jointed on the sheath. Spikelets 1-∞-flid.; lower 2- or more gls. empty, gradually increasing in size up to the flowering, with sometimes small terminal imperfect ones. Palea usually large, 2-keeled. Lodi-

celes usually 3. Stamens 3, 6, or  $\infty$ . Styles 2-3.

*Subtribe I. Arundinarieæ.* Palea 2-keeled; stamens usually 3; pericarp thin, adnate to the seed.

Spikelets 1-many-fl.; racemed or paniced; empty  
gls. 1-2. 75. *Arundinaria*.

Spikelets 1-4-fl., spicate; spathes bracteate;  
empty gls. 2-3. 76. *Phyllostachys*.

*Subtribe II. Eubamuseæ.* Palea usually 2-keeled; stamens 6; pericarp thin, adnate to the seed.

77. *Bambusa*.

*Subtribe III. Dendrocalameæ.* Palea 2-keeled; stamens 6; pericarp fleshy or crustaceous; seed free.

78. *Dendrocalamus*.

*Subtribe IV. Melocanneæ.* Spikelets 1-fl. Palea O or glume-like. Stamens 6- $\infty$ . Pericarp crustaceous or fleshy, seed free.

79. *Schizostachyum*.

### I. *Paspalum* LINN.

*Conspetus of the species.*

Spikelets rounded obtuse nearly orbicular.

First and second glumes membranaceous..... 1. *P. scrobiculatum*.

First glume membranaceous, but second glume coriaceous.....  
..... 2. *P. akoensis*.

Spikelets oblong acute at the apex.

First and second glumes 5-nerved. .... 3. *P. distichum*.

First glume 4-nerved, second glume 5-nerved.....  
..... 4. *P. distichum* var. *anpinense*.

1. ***Paspalum scrobiculatum* LINN., MATSUM. et HAYATA Enum. Pl. Formos. p. 497.**

2. ***Paspalum akoensis* HAYATA sp. nov. (Fig. 26).** Caulis 80 cm. longus erectus glaber. Folia radicalia minora cum vaginis 9 cm. longa, caulina longiora cum vaginis 30 cm. longa, vaginis 10 cm. longis glabris, ligulis 1 mm. longis membranaceis truncatis glabris  $3\frac{1}{2}$  mm. latis, laminis linearibus 20 cm. longis 5-6 cm. latis apice acuminatis basi ad 3 mm. con-

tractis utraque pagine glabris et lævibus margine glabris lævibus. Spicæ 2-6 versus apicem caulis subsecunde paniculatim dispositæ a se 5-10 mm. remotæ lineares 5-7 cm. longæ 3 mm. latæ sessiles rectæ ascendentes vel patentes; rhachis spicæ complanata alata cum ala 5-7 cm. longa 2 mm. lata glabra, costa utraque pagine elevata. Spiculæ ad paginam inferiorem rhachis secunde utroque latere

costæ 1-seriatim dispositæ contiguæ, pedicellis spiculæ e costa oriundis 1-1½ mm. longis alatis cum alis ½ mm. latis plus minus pubescentibus apice incrassatis cum spicula articulatis. Spiculæ globosæ 2 mm. longæ minus quam 2 mm. latæ apice obtusæ plus minus complanatæ; glumæ 3, extima globosa 2 mm. longa valde concava membranacea tenuiter 5-nervia

apice rotundata basi contracta; glumæ interiores globosæ valde concavæ 2 mm. longæ margine tenuiter incurvæ indurata nitidæ; palea oblonga 1½ mm. longa 1⅓ mm. lata apice obtusa basi contracta valde concava margine interiore incurva basi utroque latere auriculis triangularibus incurvis instructa.

HAB. Akō, leg. T. SOMA, Aug. 1914.

Differs from *P. scrobiculatum* by the coriaceous shining second and smooth (not pitted) third, glumes. In *P. scrobiculatum* both first and second glumes are membranaceous and the third glume is sometimes pitted on the margin.

3. ***Paspalum distichum* LINN.**; MATSUM. et HAYATA Enum. Pl. Formos. p. 497.

4. ***Paspalum distichum* L. var. *anpinense* HAYATA v. n.** (Fig. 27) Spiculæ ovato-oblongæ complanatæ glabræ 3½ mm. longæ 1½ mm. latæ apice

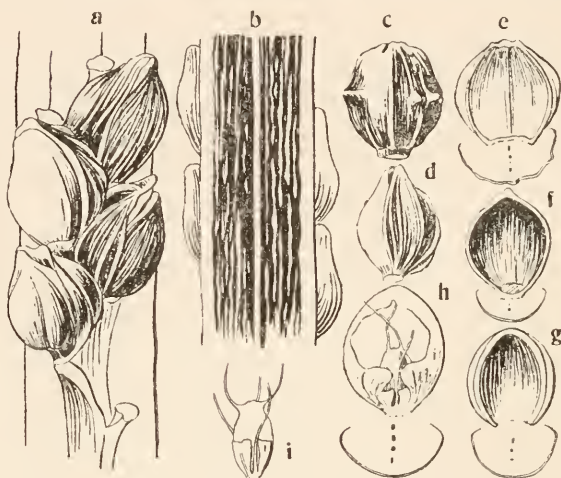


Fig. 26, *Paspalum akoense* HAYATA; a, a portion of a spike; b, the same, seen from back; c, a spikelet; d, the same, seen from side; e, gl. I.; f, gl. II.; g, gl. IV.; h, palea; i, pistil with lodicules.



acutæ; gluma I. tenuissima medio enervia prope marginem utroque latere 2-nervia margine interiore plicata glabra; gl. II. 5-nervia cum gl. I. conformis; gluma III. cum palea conformis oblonga  $2\frac{1}{2}$  mm. longa apice acuta indurata nitida.

HAB. Anpin,  
Sept. 1913, leg. T.  
SōMA.

Differs from the type in having the 4-nerved first and 5-nerved second glumes. In the type, they are all 5-nerved.

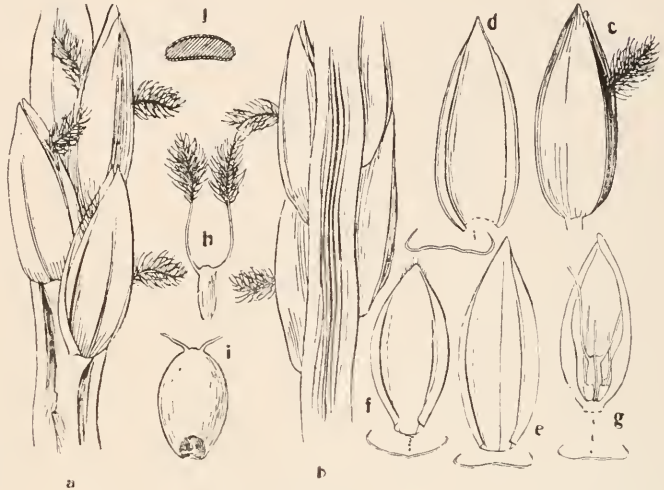


Fig. 27, *Paspalum distichum* LINN. var. *apinense* HAYATA; a, a portion of a spike; b, the same, seen from back; c, a spikelet; d, gl. I.; e, gl. II.; f, gl. III.; g, a palea; h, a pistil; i, a caryopsis; j, section of the same.

## II. *Eriochloa* H. B. et K.

Spikelets thinly hirsute, smaller..... 1. *E. polystachya*.  
Spikelets densely villose, larger ..... 2. *E. villosa*.

1. ***Eriochloa polystachya*** B. H. et K.; MATSUM. et HAYATA Enum. Pl. Formos. p. 498.

2. ***Eriochloa villosa*** KUNTH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 498.

## III. *Isachne* R. Br.

1. Flowers in a spikelet are nearly alike, both hirsute or both glabrous ..... 2  
Flowers in a spikelet are unlike; one is glabrous, the other hirsute ..... 1. *I. heterantha*.
2. Panicles spreading 10 cm. long, branches spreading.... 2. *I. arisanensis*.  
Panicles contracted..... 3
3. Stem erect, leaves rigid scabrous, but not hirsute, outer and flowering glumes glabrous ..... 3. *E. australis*.

Stem shorter prostrate at the base, but ascending under panicles;

leaves soft, hirsute..... 4

4. Flowers nearly glabrous..... 4. *I. formula*.

Flowers densely hirsute ..... 5. *I. debilis*.

1. ***Isachne heterantha*** HAYATA sp. nov. (Fig. 28). Caulis basi procumbens apice ascendens basi ad nodos radicans, internodiis 2-3 cm. longis, multi-sulcatus multi-striatus teres ad nodos barbatus 30-40 cm. longus. Folia longe vaginata, lamina oblonga  $2\frac{1}{2}$ -2 cm. longa 8-10 mm. lata apice

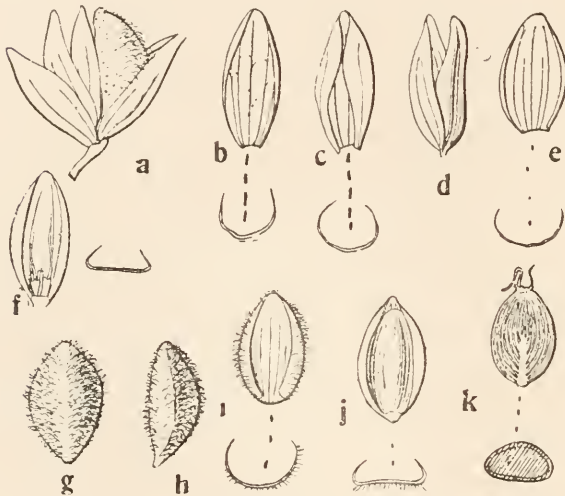


Fig. 28, *Isachne heterantha* HAYATA; a, a spikelet; b, glume I.; c, glume II.; d, gl. III. with its palea; e, glume III.; f, palea of gl. III.; g, glume IV., h, the same, seen from side; i, glume IV.; j, Palea of the glume IV.; k, caryopsis.

acuminata basi cordato-rotundata amplexicauli utraque scabra hirsuta margine integra nervo-marginata ad marginem scabra basi margine longe ciliata, vagina 1-2 cm. longa tubiformi barbata, ligula ad barbas numerosas reducta. Panicula terminalis 4 cm. longa 3 cm. lata, ramis ramulis rectis patentibus plus minus crispatis subglabris, pedicellis 1-3 mm. longis. Spiculæ oblique

globose ad apicem pedicellorum supra glumas inferiores articulatum insitæ; gl. I. et II. æquiformes oblongæ  $1\frac{1}{3}$  mm. longæ membranaceæ 5-7-nerviæ; gl. III. tenuissime membranacea oblonga  $1\frac{1}{4}$  mm. longa apice obtusa glabra paleam conformem ferens; gluma IV. crustacea oblonga 1 mm. longa obtusa hirsuta valde convexa, palea dorso hirsuta plana margine interiore incurva obtusa oblonga 1 mm. longa.

HAB. Taihoku, Mentenzan, leg. Y. SHIMADA, Oct. 1913, (typus No. 1) Taihoku, Oct. 1906, leg. G. NAKAHARA.

Rather small form, resembling *Isachne myosotis*; but in this new

species, the outer glumes are quite glabrous, and the flowering glume and palea of the sessile lower sterile flower are membranous and quite glabrous, while those of the stalked upper fertile flower are coriaceous and densely hirsute.

2. ***Isachne arisanensis* HAYATA** sp. nov. (Fig. 29). Rhizoma ignotum. Caulis 60 cm. longus gracillimus simplex haud ramosus glaber basi procumbens ad nodos radicans, internodiis 5–6 cm. longis. Folia tota caulina patentissima reeta, vaginis 3–3½ cm. longis latere uno fissis margine ciliatis, ligulis e pilis reetis 2 mm. longis constitutis, laminis lanceolato-linearibus 5–10 cm. longis 5–7 mm. latis apice acuminatis basi plus minus contractis ad 2 mm. contractis margine scaberulis utraque pagine glabris. Panícula laxa pyramidalis 9 cm. longa

totiusque lata apice aeta, ramis et ramulis gracillimis glabris plus minus crispatis laxe speculiferis, pedicellis 5–10 mm. longis glabris supra glumas inferiores articulatis. Spiculae late obconicae 1½ mm.

longae 1⅓ mm. latae 2-floriferae; glumae I. et II. inferiores vacuae oblongae subaequales 1½ mm. longae 3–5-nerviae glabrae; gl. III. et IV. floriferae subaequales 1⅓ mm. longae valde coneavae eum palea induratae apice aetae; Paleae oblongae 1 mm. longae dorso planae margine interiore plicatae glabrae.

HAB. Arisan: Mingetsu, locis umbrosis 7000 ped. alt., April. 1916. leg. B. HAYATA.

Near *I. australis* R. Br., but differs from it by the much taller and slenderer form with very much spreading panicles and smaller spikelets. The leaves are much larger measuring 10 to 15 cm. in length.

3. ***Isachne australis* R. Br.; MATSUM. et HAYATA Enum. Pl. Formos. p. 499.**

*Isachne Clarkei* HAYATA Fl. Mont. Formos. p. 234, (non Hook. f.).

4. ***Isachne formula* BÜSE; HEMSLEY Ind. Fl. Sin. III. p. 322.**

*Isachne myosotis* NEES. var. *nudiglumis* HACK.; MATSUM. et HAYATA

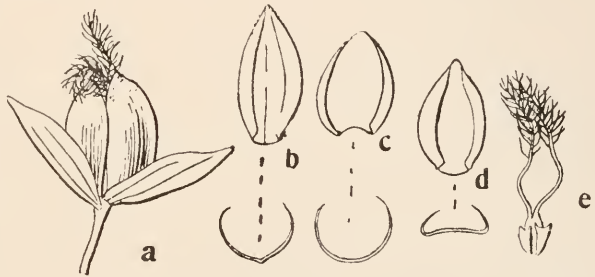


Fig. 29, *Isachne arisanensis* HAYATA; a, a spikelet; b, glume II.; c, glume III.; d, a palea; e, a pistil.

Enum. Pl. Formos. p. 500.

5. ***Isachne debilis*** RENDLE (Fig. 30); HEMSLEY Ind. Fl. Sin. III. p. 322.

*Isachne monticola* HACK. (non BÜSE) in Bull. Herb. Boiss. Ser. 2, IV. (1904) p. 528; MATSUM. et HAYATA Enum. Pl. Formos. p. 499.

#### IV. *Sphærocaryum* NEES.

HOOK. f. Fl. Brit. Ind. VII. p. 246; TRIM. Fl. Ceyl. V. p. 258.

The present genus is represented

by a single species *S. elegans* or *Isachne pulchella*. It seems that BENTHAM regarded this genus to be referable to *Isachne*. He gives no account of *Sphærocaryum* in his "Genera Plantarum" Vol. III., but mentions *I. pulchella* in his Flora Hongkongensis which species is regarded by HOOKER to be referable to *S. elegans*. HACKEL says in "Nachträge zur Nat. Pfl.-fam" that he thinks the genus has quite the same character as *Isachne*. As far as my knowledge extends, the spikelets of *Sphærocaryum* is always single-flowered, and the structure is sufficiently different from that of spikelets of *Isachne*. It may be, as HACKEL says, two artificial to arrange *Sphærocaryum* under the Agrostinæ; but it may be quite natural to refer the genus to the Paniceæ and to place it close to *Isachne*.

***Sphærocaryum elegans*** NEES.; HOOK. f. Fl. Brit. Ind. VII. p. 246; RENDL. in HEMSLEY Ind. Fl. Sin. III. p. 387; TRIM. Fl. Ceyl. V. p. 258; DUNN et TATCHER Fl. Hongk. et Kwant. p. 317.

*Isachne pulchella* BENTH. Fl. Hongk. p. 417.

*Panicum barbivaginale* HAYATA Mater. Fl. Formos. p. 400.

HAB. Kimpōri, leg. B. HAYATA, Aug. 1900; Kappanzan, leg. T. SŌMA, Oct. 1911.

#### V. *Panicum* LINN.

Key to the sections.

(Arranged after HOOKER's system given in "Fl. Brit. Ind. VII. pp. 27-28.")

A. Spikelets terete or dorsally compressed.

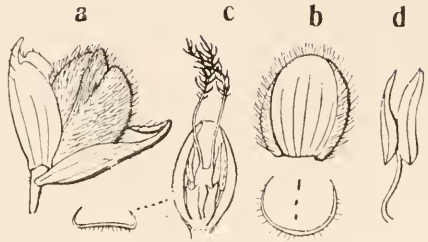


Fig. 30, *Isachne debilis* RENDL.; a, a spikelet; b, a flowering glume; c, a palea with the pistil; d, a stamen.

- I. Branchlets of panicle not produced beyond the terminal spikelets into awn-like bristles.

Spikelets 2-seriate, close-set on the undersurface of the flat rachis of a simple spike, globose or ovoid; awn 0; gl. I. very small, IV. very rugose; perennials; spikes alternate forming a simple raceme. .... 1. *Paspaloideæ*.

Spikelets 3-4-seriate crowded on the undersurface of a branched spike, ovoid; gl. I half as long as III or shorter, II and III strongly nerved cuspidate or rigidly awned, IV. hard in fruit; annuals; spikes alternate or crowded in usually a simple raceme..... 2. *Echinochloa*.

Spikelets irregularly 1-2-(rarely 3-) seriate on the slender or spiciform branches of a simple raceme, solitary or geminate, distant or crowded, ovoid or obovoid; gl. I. shorter than half as long as III, II. and III. subequal, awn 0....3. *Brachiaria*.

Spikelets small, crowded in spiciform panicles ovoid or lanceolate, sometimes decurved; gls. usually strongly ribbed, I. much shorter than III., IV., usually much shorter than III., narrow, white. .... 4. *Hymenachne*.

Spikelets solitary, rarely binate, sessile or pedicelled on the slender branches of a decompound usually open panicle. .... 5. *Effusa*.

- II. Branchlets of panicle produced beyond the terminal spikelet into a rigid awn-like bristle.

Spikelets solitary, sessile or pedicelled on the slender branches of a decompound open panicle. Leaves plicate..... 6. *Ptychophyllum*.

- B. Spikelets strongly laterally compressed.

Spikelets very minute, panicle; gl. IV. semilunar, perennial very slender grasses..... 7. *Gibbosæ*.

Sect. I. *Paspaloideæ*.

***Panicum punctatum*** BURM. (Fig. 31); Hook. f. Fl. Brit. Ind. VII. p.

29. "Spikes longer than the internodes, tip usually excurrent setiform,



spikelets  $\frac{1}{20}$ – $\frac{1}{16}$  in. plano-convex erecto-patent glabrous, gl. I. very short truncate, II.=about half IV. suborbicular 3-nerved, tip rounded or truncate,

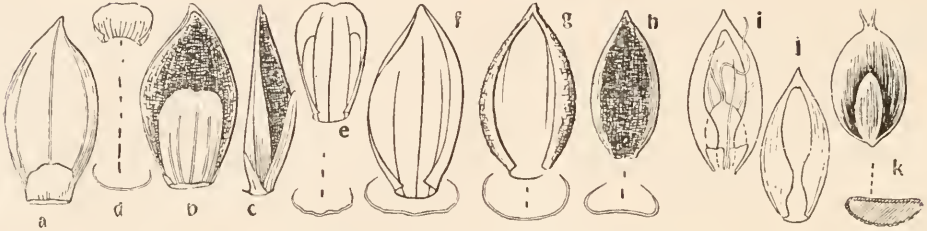


Fig. 31, *Panicum punctatum* BURM.; a, b, c, spikelets, seen from different sides; d, gl. I.; e, gl. II.; f, gl. III.; g, gl. IV.; h, i, j, palea, seen from different sides; k, a caryopsis.

III. ovate acute 3-5-nerved nenter, IV. ovate cuspidately acuminate granulate."

HAB. Anpin, Sept. 1913, leg. T. SŌMA.

Sect. II. *Echinochloa*.

**Panicum Crus-Galli** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 501.

Sect. III. *Brachiaria*.

1. Spikelets 3 mm. long, stem much taller..... 2  
Spikelets less than 2 mm. long, smaller grasses..... 3
2. Spikes 4 cm. long, leaves much longer, stem taller.....  
..... 1. *P. pseudodistachyum*.  
Spikes usually shorter, leaves smaller, stem lower than the preceding species..... 2. *P. distachyum*.
3. Spikelets villose..... 3. *P. villosum*.  
Spikelets glabrous. .... 4. *P. prostratum*.

1. **Panicum pseudodistachyum** HAYATA n. n.

*Panicum paspaloides* HAYATA (non PERS.) Mater. Fl. Formos. p. 401.

2. **Panicum distachyum** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 502.

3. **Panicum villosum** LAM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 506.

4. **Panicum prostratum** LAM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 505.

Sect. IV. *Hymenachne*.

Much taller plant with longer leaves and spikes; glume IV. membranaceous..... 1. *P. amplexicaule*.

Much smaller grass, with smaller leaves and spikes; glume IV. white crustaceous. .... 2. *P. indicum*.

1. ***Panicum amplexicaule*** RUDGE; MATSUM. et HAYATA Enum. Pl. Formos. p. 500.=*P. myurus* H. B. et K.

2. ***Panicum indicum*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 503.

Sect. V. *Effusae*.

1. Pedicels long barbate. ....  
     Glume IV. coriaceous manifestly granulate... 1. *P. barbipedum*.  
     Gl. IV. coriaceous smooth shining. .... *P. suishaense*.  
     Pedicels not barbate, at most thinly hirsute, glume IV. coriaceous or membranaceous usually smooth.....2.
2. Glume I. very thin, membranaceous nearly enerved very short less than  $\frac{1}{3}$  gl. III. in length, truncate or very obtuse. ....3.  
     Glume I. not very thin distinctly nerved more than  $\frac{1}{2}$  gl. II. in length acute or obtuse. ....5.
3. Panicle very much spreading with numerous capillary branches, nearly 30 cm. long.....3. *P. decompositum*.  
     Panicle-branches less spreading.....4.
4. Spikelets acute, leaves larger, stem taller..... 4. *P. proliferum*.  
     Spikelets obtuse, leaves smaller, stem shorter.....5. *P. repens*.
5. Spikelets less than 2 mm. in length. ....6.  
     Spikelets nearly 4 mm. long..... 6. *P. miliaceum*.
6. Leaves cordate at the base. ....7.  
     Leaves rounded at the base .....8.
7. Leaves linear-lanceolate. ....7. *P. montanum*.  
     Leaves ovate-lanceolate..... 8. *P. brevifolium*.
8. Pedicels of spikelets spreading nearly right angle.... 9. *P. sarmentosum*.  
     Spikelets adpressed to the branches of panicles. ....9.
9. Panicles contracted..... 10. *P. submontanum*.

Panicles very spreading..... 11. *P. acroanthum*.

1. ***Panicum barbipedum*** HAYATA sp. nov. (Fig. 32). Perennis, Rhizoma repens. Caulis basi procumbens ad nodos radicans, internodiis inferioribus  $1\frac{1}{2}$  cm. longis, sursum erectus, partibus erectis 15–20 cm. longis, toto glaber sed ad nodos sericeo-hirsutus toto longitudine foliatus. Folia tota caulina, vaginis  $2\frac{1}{2}$  cm. longis glabris complanatis latere uno fissis margine uno ciliatis, ligulis e pilis rectis fasciculatis constitutis 1 mm. longis; laminis lanceolatis  $4\frac{1}{2}$  cm. longis 7 mm. latis apice acuminatis basi cordatis ad 3 mm.

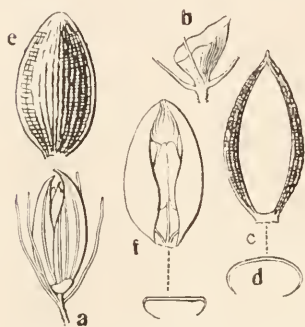


Fig. 32, *Panicum barbipedum* HAYATA; a, a spikelet; b, gl. I.; c, gl. IV.; d, section of the same; e, a palea; f, the same, seen from within.

contractis margine scaberulis prope basin patentociliatis utraque pagine glabris. Panicula terminalis, ramis et ramulis scabris minute hirsutis. Spiculæ pedicellatæ secus rhachin geminatim insitæ, altra longe altra breve pedicellata, pedicellis  $\frac{1}{2}$ –1 mm. longis apice barbibus 1–2 instructis scabris, barbibus 1–2 mm. longis ascendentibus; spiculæ cum pedicellis articulatæ oblongæ plus minus complanatæ  $1\frac{3}{4}$  mm. longæ 1 mm. latæ apice acutæ; glumæ 4, extima minima hyalina oblique cupuliformis  $\frac{1}{2}$  mm. longa, gl. II. oblonga  $1\frac{3}{4}$  mm.

longa apice acuta basi plus minus contracta apice apiculata 7-nervia glabra, gl. III. subæqualis apice apiculata 3-nervia paleam hyalinam oblongam obtusam fovens, gl. IV. ovata  $1\frac{1}{2}$  mm. longa  $\frac{3}{4}$  mm. lata apice apiculata dorso minute elevato-tessellata margine interiore incurva indurata paleam fertilem fovens, palea oblonga  $1\frac{1}{3}$  mm. longa  $\frac{2}{3}$  mm. lata apice obtusa margine carinata nitida dorso plana minute tessellata margine tenuior hyalina basi leviter auriculata. Stamina 3.

HAB. Taitō.

Near *P. repens*, but differs from it in having long barbate pedicels and much smaller leaves and panicles. Remarkable for the very small enerved first glume.

2. ***Panicum suishaense*** HAYATA sp. nov. (Fig. 33). Perennis. Rhizoma suberectum breve; caules cæspitosi cum paniculis 80 cm. alti laxè hirsuti vel subglabri gracillimi teretes medio  $\frac{2}{3}$  in diametro. Folia plerumque radicalia

cum vaginis 40 cm. longa crecta, vaginis 8-9 cm. longis dense hirsuto-barbatis pilis patentibus latere uno fissis, ligulis c pilis fasciculatis constitutis 1 mm. longis, laminis linearibus 30 cm. longis 4-5 mm. latis apice acuminatis basi gradatim ad 2 mm. attenuatis haud contractis utraque pagine villosa-barbatis demum subglabris margine scaberrimis ciliatis. Panicula laxissime spiculifera 20 cm. longa 10 cm. lata remotissime ramosa, ramis a se 8 cm. remotis rectis ascendentibus, ramulis sursum plus minus crispatis rectis ascendentibus remotissime spiculiferis. Spiculæ cum pedicellis 2-3 mm. longis longe hirsutis articulatæ; gl. I. brevior oblonga 2 mm. longa apice acuta vel obtusa sub-trinervia basi spiculam amplexans glabra; gl. II. ovata  $3\frac{1}{2}$  mm. longa longior glabra 7-nervia apice acuta, gl. III. 9-nervia  $3\frac{1}{2}$  mm. longa glabra paleam sterilem fovens; gl. IV. crustacea nitida oblonga  $2\frac{1}{2}$  mm. longa apice obtusa pallido-flava margine interiore plicata; palea crustacea nitida cum gl. IV. conformis. Caryopsis ellipsoidea 2 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusa complanata.

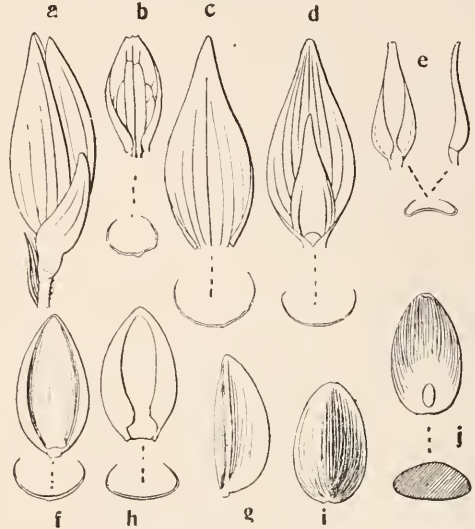


Fig. 33, *Panicum suishaense* HAYATA: a, a spikelet; b, gl. I.; c, gl. II.; d, gl. III.; e, palea of the gl. III.; f, g, gl. IV. seen from different sides; h, palea; i, j, caryopsis, seen from different sides.

HAB. Suisha, leg. B. HAYATA, Aug. 1912.

3. ***Panicum decompositum*** R. BR.; MATSUM. et HAYATA Enum. Pl. Formos. p. 504.

HAB. Takaw. The specimen before us is very probably the same plant recorded from Formosa under *P. decompositum* by RENDLE. This is perhaps a mere form of *P. proliferum*. So far, we have never seen *P. decompositum* in the island.

4. ***Panicum proliferum*** LAM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 504.

*P. paludosum* ROXB.

5. ***Panicum repens*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 505.

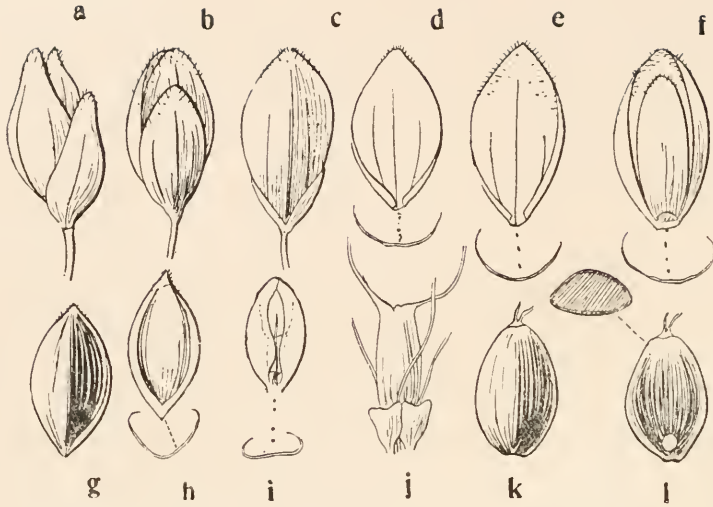


Fig. 34, *Panicum sarmentosum* ROXB.; a, b, c, spikelets, seen from different sides; d, gl. I.; e, gl. II.; f, gl. III, with a sterile palea; g, gl. IV., the same, seen from face; h, a fertile palea; i, a pistil with lodicules; k, l, a caryopsis, seen from different sides.

6. ***Panicum miliaceum*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 503.

7. ***Panicum montanum*** ROXB.; HAYATA Fl. Mont. Formos. p. 234.

8. ***Panicum brevifolium*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 501.

9. ***Panicum sarmentosum*** ROXB. (Fig. 34); HAYATA Mater. Fl. Formos. p. 402.

10. ***Panicum submontanum*** HAYATA Mater. Fl. Formos. p. 402. *P. Nakaharai* HAYATA Tokyo Bot. Mag. p.

11. ***Panicum acroanthum*** STEUD.; MATSUM. et HAYATA Enum. Pl. Formos. p. 500.

Sect. VI. *Ptychophyllum*.

***Panicum excurrens*** TRIN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 502.

*P. plicatum* LAM.

*P. neurodes* SCHULT.

Sect. VII. *Gibbosæ*.

***Panicum patens*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 504.



VI. *Digitaria* RICH.*Key to the species.*

1. Spikes in terminal pairs more than 10 cm. long..... 1. *D. barbata*.  
Spikes digitate..... 2
2. First glume very minute or sometimes reduced, second glume nearly  
equalling the third..... 3  
First glume very minute or entirely reduced, second  
glume shorter than the third. .... { 4. *D. Henryi*.  
5. *D. formosana*.  
6. *D. sanguinalis*.
3. Spikes 9–10 cm. long. .... 2. *violascens*.  
Spikes nearly 5 cm. long..... 3. *longiflora*.

*D. Henryi*, *D. formosana*, *D. sanguinalis*, and several varieties of the latter are very difficult to be distinguished one from another, and differences between them are in nearly all cases very slight and of accessory characters.

1. ***Digitaria barbata*** WILLD.; MATSUM. et HAYATA Enum Pl. Formos. p. 507.

*Panicum heteranthum* NEES.

2. ***Digitaria violascens*** LINK.; HAYATA Gen. Ind. Fl. Formos. p. 95.  
*Panicum violascens* KUNTH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 506.

3. ***Digitaria longiflora*** PERS.; RENDLE, in HEMSL. Ind. Fl. Sin. III. p. 324.

*Panicum parvulum* TRIN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 504.

4. ***Digitaria Henryi*** RENDLE; MATSUM. et HAYATA Enum. Pl. Formos. p. 507.

5. ***Digitaria formosana*** RENDLE; MATSUM. et HAYATA Enum. Pl. Formos. p. 507.

6. ***Digitaria sanguinalis*** SCOP.; MATSUM. et HAYATA Enum. Pl. Formos. p. 507.

VII. *Ichnanthus* BEAUV.

***Ichnanthus pallens*** MUNRO; MATSUM. et HAYATA Enum. Pl. Formos. p. 506.

VIII. *Thysanolæna* NEES.

**Thysanolæna Agrostis** NEES; MATSUM. et HAYATA Enum. Pl. Formos. p. 516.

IX. *Chamæraphis* R. BR.

**Chamæraphis depauperata** NEES; MATSUM. et HAYATA Enum. Pl. Formos. p. 512.

X. *Spinifex* LINN.

**Spinifex squarrosus** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 513.

XI. *Oplismenus* BEAUV.

1. Spikelets solitary or clustered in a simple terminal spike.

..... 1. *O. undulatifolius*.  
Spikelets in racemose spikes..... 2

2. Stem usually tall with decumbent base, leaves 5-18 cm. long lanceolate, spikes 4-10, 3-10 cm. long, spikelets usually loosely imbricate, awns rather stout. .... 2. *O. compositus*.  
Decumbent, flaccid, leaves 1-3 cm. long, spikes 3-5 short, spikelets secund closely imbricate. .... 3. *O. Burmanni*.

(The occurrence of the last species in Formosa is doubtful.)

1. **Oplismenus undulatifolius** BEAUV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 509.

2. **Oplismenus compositus** ROEM. et SCH., MATSUM. et HAYATA Enum. Pl. Formos. p. 509.

3. **Oplismenus Burmanni** BEAUV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 508.

XII. *Axonopus* BEAUV.

Hook f. Fl. Brit. Ind. VII. p. 64; TRIM. Fl. Ceyl. V. p. 166.

The present genus is not adopted by BENTHAM who regards it to be referable to *Paspalum* (Gen. Pl. III. p. 1098). HACKEL too does not recognize *Axonopus*. As far as I can judge from the study of *Axonopus semialatus*, the structure of the spikelets resembles in some measure that of *Panicum Crus-Galli*. The difference between them exists only in paleæ. They are in *Axonopus* 2-fid, but in *Panicum* entire.

**Axonopus semialatus** Hook. f. Fl. Brit. Ind. VII. p. 64; TRIM. Fl. Ceyl. V. p. 166; FORBES et HEMSLEY. Ind. Fl. Sin. III. p. 334.

*Panicum?* *semi-alatum* KTH.; HAYATA Mater. Fl. Formos. p. 402.

HAB. Anpinchin, leg. T. YUBASHI.

XIII. *Arundinella* RADDI.

**Arundinella setosa** TRIN.; (Fig. 35) MATSUM. et HAYATA Enum. Pl. Formos. p. 515.

#### XIV. *Setaria* BEAUV.

##### *Key to Species.*

1. Panicle lobed, drooping.....1. *S. italica*.  
Panicle cylindric.....2
2. Glume rugose.....2. *S. glauca*.  
Glume smooth. ....3
3. Panicle shorter ovate-cylindric, setæ longer..... 3. *S. pachystachys*.  
Panicle longer long-cylindric, setæ shorter. .... 4. *S. viridis*.

1. **Setaria italica** KUNTH; MATSUM. et HAYATA Enum. Pl. Formos. p. 510.

2. **Setaria glauca** BEAUV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 510.

3. **Setaria pachystachys** FRANCH. et SAV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 511

4. **Setaria viridis** BEAUV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 511.

#### XV. *Pennisetum* PERS.

**Pennisetum japonicum** TRIN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 511.

**Pennisetum japonicum** TRIN. var. **viridescens** MIQ.; l.c.

#### XVI. *Thuarea* PERS.

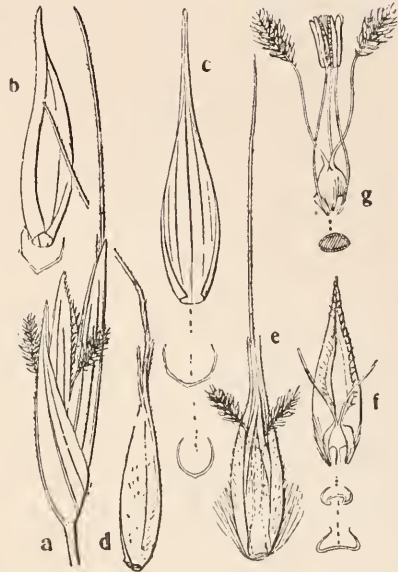


Fig. 35; *Arundinella setosa* TRIN.  
a, a spikelet; b, gl. I.; c, gl. II.; d, flowering gl.; e, a flower; f, a palea with the pistil; g, a pistil and stamens.

**Thuarea sarmentosa** PERS.; HAYATA in Bot. Mag. XXI. p. 50.

XVII. *Oryza* LINN.

**Oryza sativa** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 514.

XVIII. *Leersia* SWARTZ.

**Leersia hexandra** SWARTZ. (Fig. 36) MATSUM. et HAYATA Enum. Pl. Formos. p. 515.

*Zizania* LINN.

**Zizania aquatica** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 514.

XX. *Perotis* AIT.

**Perotis latifolia** AIT. MATSUM. et HAYATA Enum. Pl. Formos. p. 516.

XXI. *Zoysia* WILL.

**Zoysia pungens** WILLD.; MATSUM. et HAYATA l.c. p. 515.

XXII. *Coix* LINN.

**Coix Lachryma-Jobi** LINN.; MATSUM. et HAYATA l.c. p. 513.

XXIII. *Zea* LINN.

**Zea Mays** LINN.; MATSUM. et HAYATA l.c. p. 514.

XXIV. *Euchlæna* SCHRADER.

**Euchlæna luxurians** DURIËU (Fig. 37); Bot. Mag. t. 6414.

HAB. Taihoku: Taikanaishō, leg. Y. SHIMADA, 1909.

XXV. *Dimeria* R. BR.

**Dimeria ornithopoda** TRIN. var. **tenera** HACK.; MATSUM. et HAYATA l.c. p. 508.

XXVI. *Imperata* CYR.

**Imperata arundinacea** CYR. var. **Koenigii** HACK.; MATSUM. et HAYATA, l.c. p. 517.

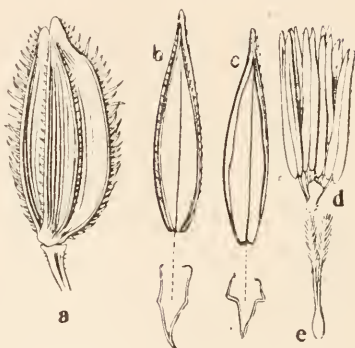


Fig. 36; *Leersia hexandra* Sw. a, a spikelet; b, gl. I.; c, gl. II; d, stamens; e, pistil.

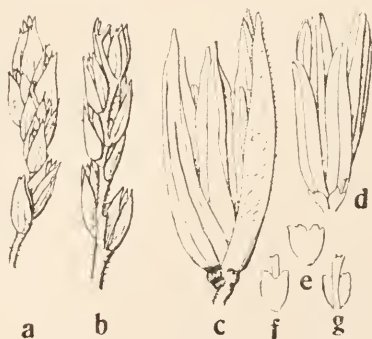


Fig. 37; *Euchlæna luxurians* DURIËU; a, b, male spikes, seen from different sides; c, a spikelet; d, stamens; e, f, g, lodicels, seen from different sides.

XXVII. *Miscanthus* ANDERS.

1. Leaves broader usually 2 cm. wide. .... 1. *M. japonicus*.  
 Leaves narrower usually less than 1 cm. wide ..... 2
2. Branches of panicles few..... 2. *M. transmorrisonensis*.  
 Branches of panicles many..... 3
3. Leaves broader ..... 3. *M. sinensis*.  
 Leaves narrower. .... 4. *M. sinensis* var. *formosanus*.  
 1. **Miscanthus japonicus** HACK.; MATSUM. et HAYATA, l.c. p. 517.  
 2. **Miscanthus transmorrisonensis** HAYATA Mater. Fl. Formos. p. 404.  
 3. **Miscanthus sinensis** ANDERS.; MATSUM. et HAYATA l.c. p. 518.  
 4. **Miscanthus sinensis** ANDERS. var. **formosana** HACK.; MATSUM. et HAYATA l.c. p. 518.

XXVIII. *Spodiopogon* TRIN.*Key to species.*

1. Spikelets nearly glabrous..... 2  
 Spikelets conspicuously barbate..... 3
2. Shortly awned..... 1. *S. tohænsis*.  
 Awnless..... 2. *S. formosanus*.
3. Leaves  $1\frac{1}{2}$ –2 cm. broad, panicles 20–25 cm. long..... 3. *S. Kawakamii*.  
 Leaves less than 1 cm. broad, panicles less than 10 cm. long ..... 4
4. Leaves smaller nearly 5 cm. long. .... 4. *S. hogænsis*.  
 Leaves more than 10 cm. long. .... 5
5. Spikelets larger, panicles more spreading. .... 5. *S. tainanensis*.  
 Spikelets smaller, panicles contracted. .... 6. *S. Takeoi*.  
 1. **Spodiopogon tohænsis** HAYATA sp. nov. (Fig. 38). Caulis 60–90 cm. altus. Folia radicalia ignota, caulina minora, vaginis 25 cm. longis glabris latere uno fissis, ligulis brevibus ciliolatis truncatis, laminis lanceolatis 10 cm. longis, 10 mm. latis apice acuminatis basi plus minus contractis utraque glabris supra scabris subtus lævibus margine scaberrimis. Culmus 50–80 cm. longus glaber teres. Panicula terminalis pyramidalis 15 cm. longa 7–8 cm. lata apice acuminata, ramis primariis; vel spicis ad nodos rhachis panicularum subverticillatim 5–10 dispositis a medio sursum spiculiferis



5-6 cm. longis glabris gracillimis complanatis haud scabris, pauce ramosis vel simplicibus. Spiculæ secus rhachin spicarum geminatim dispositæ, altra breve pedicellata altra longe pedicellata, pedicellis 1-2 mm. longis apice obpyramidaliter incrassatis glabris cum spiculis articulatis; spicula oblique



Fig. 38; *Spodiopogon tokensis* HAYATA; a and b, a spikelet, seen from different sides; c, gl. I.; d, gl. II.; e, gl. III.; f, glume IV.; g, a palea; h, caryopsis with the gl. IV. and the palea; i, and j, caryopsis, seen from different sides.

lanceolata 4 mm. longa  $1\frac{1}{2}$  mm. lata basi hirsuta cæterum glabra flore uno fovens, glumis 4; gluma I. 9-nervia ovato-oblonga  $3\frac{1}{2}$  mm. longa apice truncata mucronibus 3 instructa dorso glabra; gluma II. 9-nervia late oblonga valde concava quam gl. I. plus minus longior apice truncata plus minus mucronata basi dorso hirsuta; gluma III. hyalina gluma I. II. III. æquilonga 3 mm. longa apice truncata apice ciliolata; gluma IV. hyalina 2 mm. longa oblonga apice alte 2-lobata, lobis acutissimis inter lobos arista instructa, arista 3 mm. longa basi torta. Caryopsis obovoideo-ellipsoidea  $2\frac{3}{4}$  mm. longa 1 mm. lata apice rotundata basi plus minus angustior.

HAB. Mt. Tohozan, 6500 ped. alt., leg. S. SASAKI, Oct. 1909.

Near *S. formosanus* RENDLE, but differs from it in the awned glumes.

## 2. *Spodiopogon formosanus*

RENDLE; MATSUM. et HAYATA l.c. p. 250.

3. *Spodiopogon Kawakamii* HAYATA in Bot. Mag. (Tōkyō) XXI. p. 54.

4. *Spodiopogon hogøensis* HAYATA sp. nov. Rhizoma ignotum. Caulis erectus 60-90 cm. longus teres, internodiis 7-10 cm. longis  $1\frac{1}{2}$  mm. latis purpurascens ramosus, ramis foliatis. Folia approximativè sita, vaginis

2-2½ cm. longis latere uno fissis glabris, ligulis hyalinis membranaceis erosis brevibus, setis auricularibus 2 mm. longis paucis; laminis lanceolato-linearibus 6-7 cm. longis 4-5 mm. latis apice acuminatis basi ad 1 mm. contractis utraque glabris margine scaberulis. Panicula terminalis cylindrica 9 cm. longa 2 cm. lata, ramis et ramulis tenuiter pubescentibus vel glabris toto erectis rectis vel plus minus crispis. Spiculæ secus rhachin ramulorum geminatim sitæ, altra sessili altra pedicellata, omnibus basi cum rhachibus vel cum pedicellis articulatis; spicula basi dense hirsuta supra basin longe barbata, barbis 3 mm. longis, lanceolata 5 mm. longa; gl. I. 9-nervia 4 mm. longa apice mucronata dorso dense barbata margine hirsuta vel glabra, gl. II. cum gl. I. conformis sed apice obtusa haud mucronata; gl. III. cum gl. I. conformis sed 5-nervia minus barbata haud mucronata palcam sterilem gerens, gl. IV. florens lanceolata hyalina 3-nervia 3 mm. longa apice alte 2-lobata inter lobos arista 7 mm. longa basi torta instructa.

HAB. Musha: Hōgō, ad 4000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Remarkable for the much smaller leaves than those of other species, and much contracted panicles.

*Spodiopogon Sibiricus* TRIN.; MATSUM. et HAYATA l.c. p. 521.

The occurrence of this species in the island is very doubtful.

5. **Spodiopogon tainanensis** HAYATA in Bot. Mag. (Tōkyō) XXI. p. 53.

6. **Spodiopogon Takeoi** HAYATA sp. nov. (Fig. 39). Perennis. Rhizoma repens teres 2 mm. in diametro nodosum ad nodos radicans. Caulis distans basi ascendens sursum erectus 80 cm. longus glaber teres, internodiis 8 cm. longis 1½ mm. in diametro. Folia radicalia (plerumque caduca), caulina distantia, vaginis glabris 7-10 cm. longis latere uno fissis, ligulis 1½ mm. longis 3 mm. latis margine minute ciliolatis truncatis setis auricularibus patentibus crispatis 2-3 mm. longis; laminis linearibus 10-13 cm. longis 1 cm. latis apice acuminatis basi ad 2 mm. contractis utraque pagine glabris. Panicula terminalis in ambitu pyramidalis, ramis primariis ad nodos rachis secunde fasciculatis rectis plus minus crispatis patentibus glabris sursum ramulosis, ramulis gracillimis crispatis glabris apice plus minus incrassatis cum spicula articulatis; spiculæ ad apicem ramulorum ternatim dispositæ, una sessili, duobus pedicellatis. Spicula sessilis dense longe hirsuta 1-florata,

flore hermaphrodito, glumis 4; gl. I. oblonga 3 mm. longa 1 mm. lata apice obtusa basi plus minus contracta concava dorso longe hirsuta pilis circ. 2 mm. longis dorso prominente 7-nervia apice obtusa; gl. II. oblonga 3 mm. longa apice obtusa dorso longe hirsuta versus marginem glabra membranacea 5-nervia, nervis prominentibus; gl. III. hyalina tenuissima 3 mm. longa apice obtusa margine apiceque hirsuta cæterum glabra paleam linearem amplexans; gl. IV. linearis 3 mm. longa apice alte 2-lobata, lobis  $1\frac{1}{2}$  mm. longis acuminatis ad centrum arista 7 mm. longa basi torta instructa hyalina; palea oblonga 2 mm. longa 1 mm. lata hyalina apice hirsuta. Stamina 3. Styli 2, a medio sursum plumosi; spiculæ pedicellatæ, pedicellis longe hirsutis 2 mm. longis, pilis 2 mm. longis; glumæ 4 utæe floris spiculæ sessilis.

HAB. Nantō: Shijō, leg. T. ITO, Oct. 1916.

Near *S. tainanensis* HAYATA, but differs from it in the smaller spikelets and in the less patent panicles.

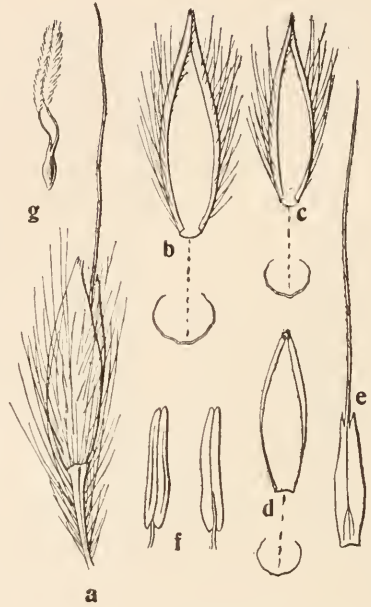


Fig. 39, *Spodiopogon Takeoi* HAYATA. a, a pedicellate spikelet; b, a gl. I.; c, gl. II.; d, gl. III.; e, gl. IV.; f, stamens; g, a pistil.

## XXIX. *Pollinia*.

### *Key to the species.*

1. Spikelets with geniculate stalks above the articulation of pedicels. .... 2
- Spikelets without stalks above the articulation of pedicels. .... 3
2. Spikes 8-10-fasciculate, spikelets densely arranged... 1 *P. geniculata*.  
    Spikes 3-4-fasciculate, spikelets loosely arranged..... 2. *P. Fauriei*.
3. Spikelets awnless. .... 3. *P. imberbis* var. *Willdenowiana*.  
    Spikelets awned ..... 4
4. Glume II. and IV. awned. 4. *P. formosana* = *P. monantha* var. *formosana*.  
    Glume II. awnless. gl. IV. awned. .... 5

5. Internodes of rhachis 2 or 3 times longer than sessile spikelets.  
 ..... 5. *P. arisanensis*.  
 Internodes of rhachis nearly equal to or shorter than spikelets..... 6.  
 6. Spikelets larger ..... 6. *P. ciliata*.  
 Spikelets smaller. .... 7. *P. monantha*.



Fig. 40, *Pollinia geniculata* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, flowering glume; e, a palea; f, stamens and a pistil; g, a lodicel.

1. ***Pollinia geniculata*** HAYATA sp. nov. (Fig. 40). 80–90 cm. alta toto longitudine usque ad basin spicæ foliata. Folia distantia alterna lanceolata 10–20 cm. longa 8–10 mm. lata apice acuminata basi attenuata margine scabra utraque pagine tenuiter hirsuta, ligula 2 mm. longa totiusque lata truncata ciliata, vagina versus apicem marginemque hirsuta extus intusque glabra 11 cm. longa. Spicæ 9–10 subdigitatim ad apicem caulis dispositæ; rhachis panicularum 3 cm. longa plus minus flexuosa. Spica singula 5–13 cm. longa plus minus recurvata multi-nodosa, internodiis 4 mm. longis complanatis subglabris, ad nodos hirsuta. Spiculæ geminatim ad nodos dispositæ, altera sessili altera pedicellata, pedicellis 3 mm. longis apice hirsutis basi cum partibus productis spiculæ sessilis connatis; spiculæ sessiles fusiformes 6 mm. longæ 1 mm. latæ apice acuminatæ basi obtusæ ad stipitem 1 mm.

longum hirsutum cum rhachi plus minus connatum geniculato-recurvum attenuatæ; gl. I. lanceolata 4 mm. longa 1 mm. lata apice acuminata plus minus bidentata dorso 2-carinata ad carinas aristato-ciliata caeterum glabra; gl. II. lanceolata 4 mm. longa apice acuminata dorso 1-carinata ad carinas aristato-ciliata; gl. florens minuta hyalina 1 mm. longa  $\frac{1}{2}$  mm. lata apice acuminata ad aristam  $1\frac{1}{2}$  cm. longam abeuns; palea hyalina minuta.

HAB. Arisan, leg. B. HAYATA, Jan. 1912.

Differs from all other species, in the spikelets having geniculate stalks above the articulation of pedicels.

2. ***Pollinia Fauriei*** HAYATA sp. nov. (Fig. 41). Culmus basi prostratus,

internodiis inferioribus 4 cm. longis, ad nodos radicans usque supra medium foliatus superne ascendens erectus. Folia distantia media linearia 7 cm. longa

4 mm. lata apice acuminata basi attenuata utraque glabra haud hirsuta, ligula membranacea 2 mm. longa totiusque lata apice truncata glabra, vagina 5 cm. longa. Spica 3-4-subdigitatim ad apicem culmi disposita 4-6 cm. longa, internodiis complanatis 5 mm. longis, ad nodos hirsuta. Spicula ad nodos geminatim disposita, altera sessili altera pedicellata; gl. I. lanceolata 4 mm. longa 1 mm. lata apice acuminata 2-dentata 2-carinata ad carinas valde aristato-ciliata caeterum glabra; gl. II. lanceolata 4 mm. longa apice acuminatissima dorso 1-carinata ad carinam aristato-ciliata; gl. florens minuta hyalina  $1\frac{1}{2}$  mm. longa  $\frac{1}{3}$  mm. lata apice arista 2 cm. longa geniculata instructa; palea minuta hyalina  $1\frac{1}{2}$  mm. longa lanceolata apice obtusa.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Dec. 1914.

Near *Pollinia geniculata* HAYATA, but distinguishable from it in the broader lanceolate glumes, and not stalked spikelets.

3. ***Pollinia imberbis* NEES.**  
var. ***Willdenowiana* HACK.** (Fig. 42) MATSUM. et HAYATA, l. c. p. 521.

4. ***Pollinia arisanensis* HAYATA** sp. nov. (Fig. 43). Caulis 30-40 cm. longus basi repens ad nodos radicans a basi usque medium remotissime foliatus. Folia media ovato-lanceolata circ. 4 cm. longa 4-5 mm. lata apice acuminata basi

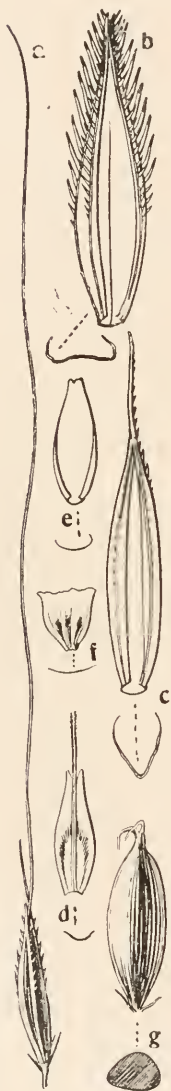


Fig. 41, *Pollinia Fauriei* HAYATA. a, spikelet; b, gl. I.; c, gl. II.; d, flowering glume; e, a palea; f, a lodicel; g, a caryopsis.



Fig. 42, *Pollinia imberbis* NEES. var. *Willdenowiana* HACK. a, b, a portion of a spike, seen from different sides.



obtusa margine laevis sed sursum scaberrima supra parcissime hirsuta vel glabra subtus glabra, ligula minuta  $\frac{1}{2}$  mm. longa totiusque lata truncata ciliata membranacea, vagina 8 cm. longa apice truncata longe barbata, barbis 2-3 mm. longis. Spicæ solitariae vel geminatim dispositæ terminales simplices vel paucè ramosæ 4-5 cm. longæ, internodiis 1 cm. longis semiteretibus lævibus, ad nodos barbatae cæterum glabræ; spiculæ geminatim ad nodos rhachillæ dispositæ, altera sessili altera pedicellata, pedicellis 3-4 mm. longis glabris; spicula sessilis: gl. I. lanceolata  $4\frac{1}{2}$  mm. longa 1 mm. lata apice acuminata apice 2-dentata margine hirsuta basi extus hirsuta dorso 2-carinata; gl. II. conformis dorso 1-carinata; gl. florens hyalina 1-nervia  $1\frac{1}{2}$  longa  $\frac{1}{5}$  mm. lata apice 2-dentata vel acuminata inter dentes arista scabra 13 mm. longa instructa. Caryopsis cylindrica 2 mm. longa  $\frac{1}{3}$  mm. lata.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Dec. 1914.

Near *Pollinia nuda* TRIN., but differs from it in the pedicelled spikelets which are in this new species much longer stalked than those of *P. nuda*.

5. ***Pollinia formosana*** (HACK.) HAYATA sp. nov. (Fig. 44). Caulis 50-60 cm. longus basi repens ad nodos radicans, internodiis inferioribus 2-3 cm. longis 1 mm. in diametro, superiore ascendens, internodiis superioribus

Fig. 43, *Pollinia arisanensis* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume; e, a palea; f, a caryopsis.

7-8 cm. longis, sursum erectus toto longitudine foliatus. Folia alterna distantia lanceolata 7-8 cm. longa 7 mm. lata apice acuminata basi attenuata margine scabra supra minus subtus plus hirsuta, vagina 4 cm. longa apice dorso hirsuta, ligula membranacea 1 mm. longa apice truncata hirsuta hyalina. Spicæ



Fig. 44, *Pollinia formosana* HAYATA; a, a sessile spikelet; b, gl. I.; c, gl. II.; d, a palea; e, a stamen; f, a caryopsis; the longer awn in fig. a is the gl. III.

versus apicem caulis subdigitatim vel oppositum 5-7 dispositæ, rhachibus 1-2 cm. longis; spicis 4 cm. longis gracilibus, rhacheola hirsuta, internodiis  $2\frac{1}{2}$  mm. longis cylindrico-clavatis semiteretibus; spiculæ geminatim ad nodos rhachillæ dispositæ, altra sessili altra pedicellata; spicula sessilis: gl. I. lanceolata 3 mm. longa apice acuminata prope marginem 2-costata, ad costas aristato-ciliolata; gl. II. ovato-oblonga  $2\frac{1}{2}$  mm. longa apice acuminata ad aristam 3 mm. longam abeuns dorso sursum costata ad costas scabrida; gl. florens aristæformis filiformis 13 mm. longa plus minus crispata tortuosa basi plus minus dilatata membranacea hyalina, palea minuta oblonga  $\frac{1}{3}$  mm. longa. Stamina 3. Spicula pedicellata, pedicellis quam internodiis rhachillæ paulo brevioribus hirsutis semi-teretibus.

*Pollinia monantha* HAYATA in MATSUM. et HAYATA (non NEES) l.c. p. 522.

*Pollinia monantha* NEES. var *formosana* HACK.

HAB. Kōtōshō leg. K. MIYAKE, Nov. 1899.

Near *Pollinia monantha* NEES., but distinguishable from it specifically in the spikelets which are awned in both gl. II. and III.

6. *Pollinia ciliata* TRIN.; MATSUM. et HAYATA l.c. p. 521.

7. *Pollinia monantha* NEES.; HAYATA in General Index to the Flora of Formosa p. 99.

### XXX. *Polliniopsis* HAYATA n. g.

*Polliniopsis Somai* HAYATA sp. nov. (Fig. 45).

*Calmus* basi repens ad nodos radicans, internodiis 2-3 cm. longis, sursum ascendens 30-40 cm. longus glaber a basi usque ad medium foliatus. Folia lanceolata 4 cm. longa 5 mm. lata apice acuminata basi obtusa membranacea utraque glabra haud scabra sed lævia basi margine barbis 2 mm. longis 3-5 instructa, ligula 1 mm. lata  $\frac{1}{3}$  mm. longa ciliolata, vagina 2-3 cm. longa margine hirsuta. Spicæ geminæ ad apicem culmi terminales circ. 8 cm. longæ graciles recurvæ, rhachibus rectis haud reflexis glabris, internodiis spicæ 5 mm. longis complanatis glabris lævibus haud vel vix hirsutis. Spiculæ



Fig. 45, *Polliniopsis Somai* HAYATA; a, a spikelet; b, the same more magnified, awns partly taken off; c, gl. I.; d, gl. II.; e, gl. III.; f, gl. IV.; g, a lodicel; h, a young caryopsis.

geminatim ad nodos rachis spicæ dispositæ pedicellatæ, pedicello altro longiore altro breviorē; gl. I. lanceolata 5 mm. longa 1 mm. lata apice acuminata et 2-aristata, aristis 1 mm. longis, margine interiore plicata basi hirsuta cæterum glabra; gluma II. lanceolata 3 mm. longa apice acuminata apice arista 8 mm. longa instructa margine sursum ciliata; gl. III. linearis 2 mm. longa  $\frac{1}{2}$  mm. lata hyalina apice 2-dentata, inter dentes arista 10 mm. longa instructa, arista basi plicato-geniculata; gl. IV. cm. III. conformis; palea?

HAB. Mentengan, leg. T. SOMA, Nov. 1914.

Near *Pollinia*, but differs from the genus in having binate spikelets which are both pedicellate, and in the 2-aristate gl. I., 1-long awned glumes, II., III. and IV.

### XXXI. *Saccharum* LINN.

1. Hairs on the callus equal or shorter than spikelets .....1. *S. Narenga*.  
Hairs on the callus much longer than spikelets. ....2
2. Stem hairy below the panicles.....2. *S. spontaneum*.  
Stem glabrous below the panicles. ....3. *S. officinale*.
1. ***Saccharum Narenga*** HAM.; MATSUM. et HAYATA l.c. p. 519.
2. ***Saccharum spontaneum*** LINN.; MATSUM. et HAYATA l.c. p. 519.
3. ***Saccharum officinarum*** LINN.; MATSUM. et HAYATA l.c. p. 519.

### XXXII. *Erianthus* MICH.

1. Hairs of spikelets more or less purple. ....1. *E. pollinioides*.  
Hairs of spikelets more or less brown. ....2. *E. formosanus*.
1. ***Erianthus pollinioides*** RENDLE; MATSUM. et HAYATA l.c. p. 520.
2. ***Erianthus formosanus*** STAFF; MATSUM. et HAYATA l.c. p. 520.

### XXXIII. *Ischæmum* LINN.

Key to Species.

1. Rachis of spikes densely long barbate at the nodes only. ....  
..... 1. *I. angustifolium*.  
Rachis of spikes not barbate at the nodes..... 2
2. Spikes solitary.....2. *I. muticum*.  
Spikes binate or ternate..... 3
3. Outer glumes densely or loosely barbate. .... 4  
Outer glumes nearly glabrous.....3. *I. Sieboldii* var. *formosanum*.

4. Outer glumes densely barbate. . . . . 4. *I. aristatum*.  
 Outer glumes loosely barbate. . . . . 5. *I. ciliare*.  
 1. ***Ischæmum angustifolium*** HACK.; MATSUM. et HAYATA l.c. p. 525.  
 2. ***Ischæmum muticum*** LINN.; MATSUM. et HAYATA l.c. p. 523.  
 3. ***Ischæmum Sieboldi*** MIQ. ***formosanum*** HACK.; MATSUM. et HAYATA l.c. p. 527.  
 4. ***Ischæmum aristatum*** LINN. var. ***imberbe*** HACK.; MATSUM. et HAYATA l.c. p. 525.  
 5. ***Ischæmum ciliare*** RETZ.; MATSUM. et HAYATA l.c. p. 525.

XXXIV. *Eremochloa* S. WATS.

## Key to Species.

1. Leaves 2-4 cm. long. . . . . 1. *E. ophiuroides*.

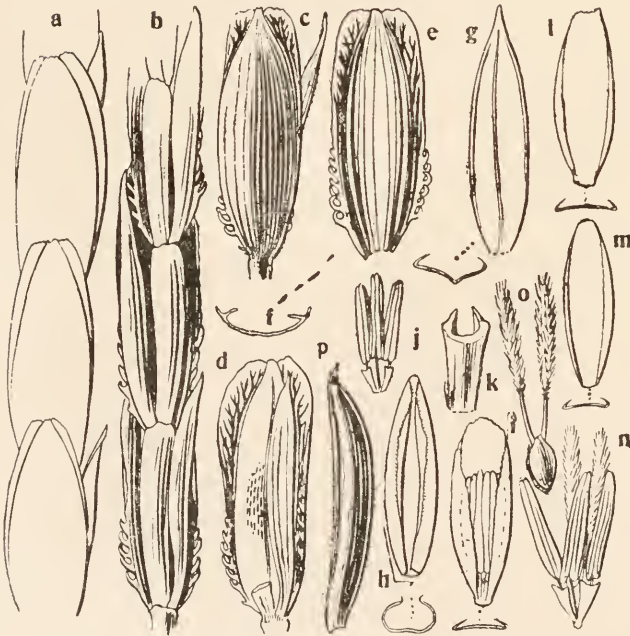


Fig. 46, *Eremochloa ophiuroides* HACK. var. *longifolia* HAYATA; a, a portion of a spike; b, the same, seen from another side; c, spikelets, one fertile, the other sterile; d, the same, seen from another side; e, gl. I.; f, section of the same; g, gl. II.; h, gl. III.; i, palea of gl. III. with stamens only; j, stamens; k, the lodicule, at the base of the same stamens; l, gl. IV.; m, palea of gl. IV.; n, stamens and a pistil in the gl. IV.; o, pistil; p, sterile spikelet.

Leaves usually 10 cm. longa.

Spikes much longer. . . . . 2. *E. ophiuroides* var. *longifolia*.

1. ***Eremochloa ophiuroides*** HACK.; HAYATA in Bot. Mag. (Tōkyō) XXI p. 50.

2. ***Eremochloa ophiuroides*** HACK. var. ***longifolia*** HAYATA. Canlis basi repens supra basin ascendens sursum erectus a basi usque ad medium foliatus. Folia linearia, lamina 10 cm. longa 2 mm. lata apice ob-

tusa basi plus minus contracta utraque pagine glabra margine medio deorsum lævis sed sursum prope apicem aristato-scabra, ligula brevissima  $\frac{1}{5}$  mm. longa hirsuta, vagina 3 cm. longa prope apicem longe barbata, barbis 2 mm. longis. Spica solitaria terminalis 5 cm. longa  $1\frac{1}{2}$  mm. lata. Cæterum ut typica.

HAB. Tainan, leg. T. SŌMA, Aug. 1914.

Differs from the type in having much longer spikes and longer leaves.

XXXV. *Pogonatherum* BEAUV.

**Pogonatherum saccharoideum** BEAUV. var. **monandrum** HACK.  
MATSUM. et HAYATA l.c. p. 522.

XXXVI. *Arthraxon* BEAUV.

**Arthraxon ciliaris** BEAUV. var. **Langsdorffi** HACK.; MATSUM. et HAYATA l.c. p. 523.

XXXVII. *Apluda* LINN.

**Apluda mutica** LINN.; MATSUM. et HAYATA l.c. p. 532.

XXXVIII. *Rottboellia* LINN.

*Key to species.*

1. Spike larger erect 9 cm. long 4 mm. broad.

..... 1. *R. exaltata* var. *appendiculata*.

Spike slender more or less recurved 5-6 cm. long 2 mm. broad.

..... 2. *R. compressa*.

1. **Rottboellia exaltata** LINN. var. **appendiculata** HACK.; MATSUM.  
et HAYATA l.c. p. 524.

2. **Rottboellia compressa** LINN. var. **genuina** HACK.; MATSUM. et  
HAYATA l.c. p. 523.

XXXIX. *Manisuris* LINN.

**Manisuris granularis** LINN.; MATSUM. et HAYATA l.c. p. 524.

XL. *Ophiurus* R. BR.

**Ophiurus monostachyus** PRESL.; MATSUM. et HAYATA l.c. p. 524.

XLI. *Andropogon* LINN.

*Key to species.*

1. Pedicels of spikes enclosed in spathiform leaf-sheaths. 1. *A. brevifolius*.  
Pedicels of spikes not enclosed in spathiform leaf-sheaths..... 2



2. Rhæhis and pedicels of upper spikelets with translucent channel.... 3  
 Rhachis and pedicels of upper spikelets opaque. .... 5
3. Spikes with many pairs of spikelets. .... 4  
 Spikes with 1-3(4) spikelets..... 2. *A. micranthus*.
4. Spikes digitate or fascicled, lower ones longer than rachis of inflorescence..... 3. *A. Ischæmum*.  
 Spikes much shorter than rachis of inflorescence.... 4. *A. intermedius*.
5. Stalked spikelet neuter, unawned.  
 ..... 5. *A. kwashotensis*.  
 Stalked spikelet bisexual, awned.  
 ..... 6. *A. formosanus*.

1. **Andropogon brevifolius** SWARTZ;  
 MATSUM. et HAYATA l.e. p. 528.

2. **Andropogon micranthus** KUNTH;  
 MATSUM. et HAYATA l.e. p. 529.

3. **Andropogon Ischæmum** LINN.; MATSUM. et HAYATA l.e. p. 529.

4. **Andropogon intermedius** R. BR  
 MATSUM. et HAYATA l.e. p. 528.

5. **Andropogon kwashotensis** HAYATA  
 sp. nov. (Fig. 47). Perennis. Caulis la-  
 aseendens 20-30 cm. altus sursum ereetus basi  
 vaginis oblongis lanceolatis obtusis instructus a  
 basi sursum vaginis foliorum toto obtectus.  
 Folia radicalia haud visa caulina distiche  
 disposita, vaginis (plerumque) 2-3 em. longis 1-1½  
 mm. latis glabris latere uno fissis, ligulis ½ mm.  
 longis 2 mm. latis truncatis margine minute  
 ciliolatis, laminis linearibus 7-8 cm. longis 5  
 mm. latis apice acuminatis basi ad 2 mm.  
 contraetis utraque pagine glabris margine  
 scabris basi prope ligulas longe barbatis, barbis  
 5 mm. longis rectis patentibus; foliis caulinis

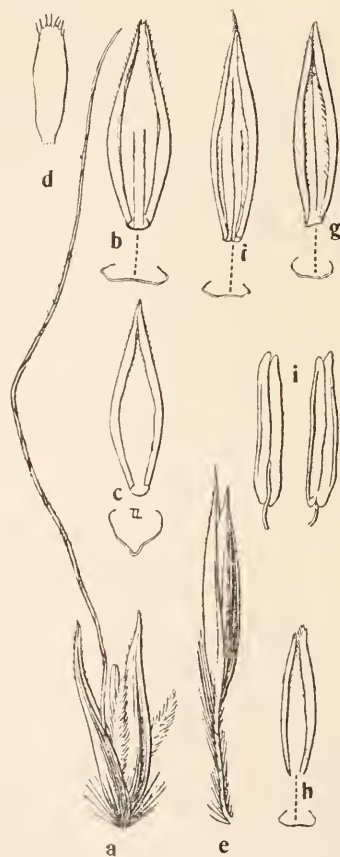


Fig. 47, *Andropogon kwashotensis* HAY. a, sessile spikelet; b, glume I. of the same; c, glume II. of the same; d, glume III. of the same; e, pedicelled spikelet; f, glume I. of the same; g, glume II. of the same; h, glume III. of the same; i, stamens.

superioribus ad bracteas abeuntibus; bracteis singulis vel duobus basi paniculæ insitis, vaginis valde conspicuis laminis valde reductis, vaginis 6–8 cm. longis deorsum tubuliformibus sursum dilatis lamiiformibus 5 mm. longis alabastrum paniculæ obtegentibus, laminis valde reductis convoluto-setiformibus 1–3 cm. longis. Panicula pyramidalis 6 cm. longa 2 cm. lata, rhachis glabra gracillima ad nodos longe hirsuta, pilis albis 2 mm. longis, vel versus ramulos rhachis hirsuta; spiculæ secus spicæ rhachin articulata ad nodos geminatæ, altræ sessili, altræ stipitata; spiculæ sessiles lanceolatæ  $3\frac{1}{2}$  mm. longæ  $\frac{3}{4}$  mm. latæ apice acuminatæ; flore uno hermaphrodito; gluma I. lanceolata  $3\frac{1}{2}$  mm. longa  $\frac{3}{4}$  mm. lata apice obtusa apice margineque ciliato-hirsuta extus intusque glabra margine sursum carinata; gluma II lanceolata  $3\frac{1}{2}$  mm. longa dorso valde plicato-carinata apice acuminata margine plicato-recurva ciliata; gluma III. multo minora linearis 2 mm. longa  $\frac{2}{3}$  mm. lata apice truncata hyalina apice ciliata; gluma IV. ad aristam rigidam tortam superne geniculatam  $1\frac{1}{2}$  cm. longam reducta; palæa O. Spiculæ altræ pedicellis longe hirsutis 2 mm. longis stipitatæ lineari-lanceolatæ 4 mm. longæ acuminatæ; gluma I. lineari-lanceolata 4 mm. longa  $\frac{3}{4}$  mm. lata multi-nervia margine apice hirsuta; gluma II. lanceolata acuminata  $3\frac{1}{2}$  mm. longa  $\frac{1}{2}$  mm. lata haud carinata margine interiore plicata margine hirsuta; gluma III. lanceolata hyalina margine tenuiter plicata ciliolata; gl. IV. minute lanceolata  $1\frac{1}{2}$  mm. longa  $\frac{1}{4}$  mm. lata, florem masculinum gerens. Stamina 3, antheris linearibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{4}$  mm. latis.

HAB. Kwashotō, leg. T. SŌMA, Juli. 1915.

Near *A. micranthus* KUNTH, but differs from it in the quite lusterless nervose spikelets.

6. **Andropogon formosanus** RENDLE; MATSUM. et HAYATA l.c. p. 528.

## XLII. *Sorghum* PERS.

### *Key to species.*

1. Joints, pedicels and callus shortly villous with purple or rufous hairs.  
..... 1. *S. fulvum*.  
Joints, pedicels and callus shortly villous, but not with purple or rufous hairs. .... 2
2. Rachis of spike tenacious. .... 2. *S. vulgare*.

Rachis of spike fragile..... 3. *S. halepense*.

1. **Sorghum fulvum** BEAUV.; FORBES et HEMSLEY Ind. Fl. Sin. III.  
p. 367.

*Andropogon serratus* THUNB.; MATSUM. et HAYATA l.c. p. 530.

2. **Sorghum vulgare** PERS.; MATSUM. et HAYATA l.c. p. 531.

3. **Sorghum halepense** PERS.; FORBES et HEMSL. Ind. Fl. Sin. III.  
p. 367; HAYATA Gen. Ind. Fl. Formos. p. 99.

#### XLIII. *Chrysopogon* TRIN.

**Chrysopogon aciculatus** TRIN.; FORBES et HEMSL. Ind. Fl. Sin. III.  
p. 368.

*Andropogon aciculatus* RETZ.; MATSUM. et HAYATA l.c. p. 527.

#### XLIV. *Cymbopogon* SPR.

**Cymbopogon Nardus** RENDLE=*Andropogon Nardus* LINN.

Subsp. **hamatidus** HACK.; FORBES et HEMSL. Ind. Fl. Sin. III.  
p. 376.

Subsp. **marginatus** var. **Goeringii** HACK. l.c. p. 376.

#### XLV. *Heteropogon* PERS.

**Heteropogon contortus** BEAUV.; FORBES et HEMSL. Ind. Fl. Sin. III.  
p. 366.

=*Andropogon contortus* LINN.; MATSUM. et HAYATA l.c. p. 528.

#### XLVI. *Themeda* FORSK.

**Themeda gigantea** HACK. subsp. **caudata** HACK.; MATSUM. et HAYATA  
l.c. p. 532.

#### XLVII. *Alopecurus* LINN.

##### *Key to species.*

Glumes 2 distinct. .... 1. *A. æqualis*.

Glumes 2 connate to half-way up. .... 2. *A. Agrostis*.

1. **Alopecurus æqualis** SOBOL.; MATSUM. et HAYATA l.c. p. 533.

2. **Alopecurus Agrostis** LINN.; HAYATA in Bot. Mag. (Tōkyō) XXI.  
p. 55.

#### XLVIII. *Polypogon* DESF.

##### *Key to species.*

1. Awn equal to the glumes. .... 1. *P. Hiegeaweri*.

Awn much longer than the glumes..... 2. *P. monspeliensis*.

1. **Polypogon Higeaweri** STEUD.; MATSUM. et HAYATA l.c. p. 535.

2. **Polypogon monspeliensis** DESF.;

MATSUM. et HAYATA l.c. p. 535.

XLIX. *Sporobolus* R. BR.

*Key to species.*

1. Glume I. II. III. and palea subequal.  
..... 1. *S. virginicus*.
- Glume I. and II. are much shorter than  
fl. glume and palea.... 2. *S. indicus*.
- ..... 3. *S. diandrus*.

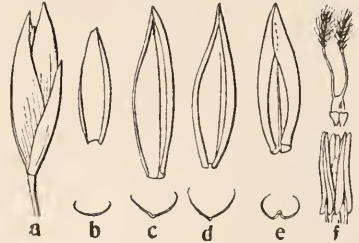


Fig. 48, *Sporobolus virginicus* KUNTH. a, spikelet; b, gl. I.; c, gl. II.; d, flowering glume; e, a palea; f, stamens; g, a pistil; all figures variously magnified.

1. **Sporobolus virginicus** KUNTH. (Fig. 48); MATSUM. et HAYATA l.c. p. 534.

2. **Sporobolus indicus** R. BR. (Fig. 49); MATSUM. et HAYATA l.c. p. 534.

3. **Sporobolus diandrus** BEAUV.; MATSUM. et HAYATA l.c. p. 533, very near to the preceding species.

L. *Agrostis* LINN.

*Key to species.*

1. Glume III. awned. .... 2  
Glume III. usually awnless very  
rarely shortly awned. .... 3
2. Glume I. 5 mm. long.  
..... 1. *A. suizanensis*.
- Glume I. 3 mm. long.  
..... 2. *A. transmorrisonensis*.

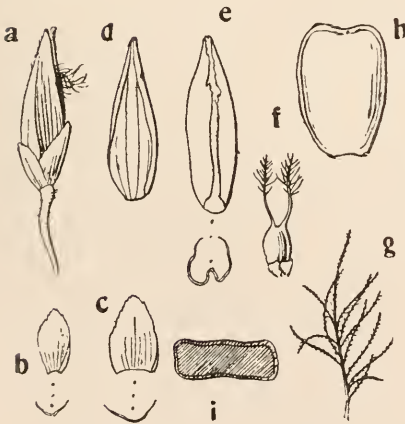


Fig. 49, *Sporobolus indicus* R. BR. a, a spikelet; b, gl. I.; c, gl. II.; d, flowering glume; e, a palea; f, a pistil; g, portion of the style; h, a caryopsis; i, section of the same; all figures variously magnified.

Glume I. 2 mm. long..... 3. *A. sozanensis*.

3. Leaves very narrow, nearly filiformed. .... 4. *A. morrisonensi*.

Leaves 2-3 mm. broad linear..... 5. *A. perennans*.

1. **Agrostis suizanensis** HAYATA sp. nov. (Fig. 50). Culmus erectus  
caespitosus gracilis glaber sed plus minus scaber 50-60 cm. longus teres.  
Folia basi caulis multo disposita inferiora breviora cum vaginis 8-20 cm.

longa; lamina mediana linearis 5–15 cm. longa convoluto-teres 1 mm. lata apice acuminata basi supra (intus) hirsuta subtus (extus) glabra 5-nervata, nervis validis, vagina 2–5 cm. longa convoluto-tereti; ligula membranacea 2 mm. lata 1 mm. longa apice truncata denticulata glabra. Panicula cylindrica 6 cm. longa 7 mm. lata, ramis primariis erecto-ascendentibus scabris rectis. Gl. I. lanceolata 4 mm. longa 1 mm. lata apice acuminata glabra 1-nervia, valde secus medium plicata dorso 1-carinata, ad carinas scaberrima. Gluma II. conformis longiora 5 mm. longa. Gluma III. hyalina ovato-lanceolata 4 mm. longa subconvoluta extus scabra apice 2-setulis instructa, dorso prope basin a basi ad 1 mm. altitudinem arista 6–7 mm. longa instructa. Palea hyalina medio 2-carinata, ad carinas scaberrima. Rhachilla supra glumas I. et II. breve hirsuta, pilis 1 mm. longis, partibus productis rhachillæ 1 mm. longis dense hirsutis.

HAB. Suizan, leg. T. SÔMA, Dec. 1914.

Nothing like this in the floras of India, China and Japan. The spikelets of this species are far much larger than any of other species. The general aspect of this new grass is entirely that of a species of *Calamagrostis*; but the callus at the base of glume III. are in the new one naked or very slightly hairy—the character which is, according to HOOKER, assigned to *Agrostis*.

2. ***Agrostis transmorrisonensis*** HAYATA sp. nov. (Fig. 51). Culmus

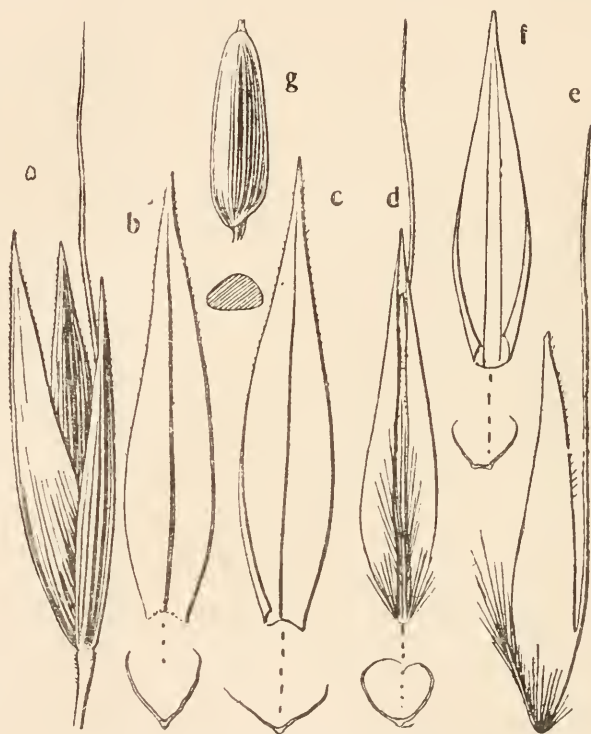


Fig. 50, *Agrostis suizanensis* HAYATA. a, a spikelet; b, glume I; c, glume II; d, a flowering glume with its palea and a prolonged portion of the rhachilla; e, the same, seen from side; f, palea; g, caryopsis.



caespitosus erectus gracilis glaber 60 cm. altus. Folia radicalia minora caulina majora, folii caulini inferioris lamina linearis 17 cm. longa  $2\frac{1}{2}$  mm. lata apice acuminata basi haud contracta subtus glabra supra minute hirsuta, ligula membranacea hyalina  $2\frac{1}{2}$  mm. lata 3 mm. longa, vagina 8 cm. longa. Panicula terminalis laxe spiculifera cylindrico-pyramidalis 15–20 cm. longa 8 cm. lata, ramis primariis superioribus 2–3-fasciculatis, inferioribus 8–9-fasciculatis, fasciculis alternis a se 2–5 cm. remotis; rachis paniculae gracilis erecta recta plus minus scabra; ramis primariis rectis ascendento-patentibus gracilibus plus minus hirsuto-scabris, ramulis secundariis rectis vel crispatis. Gl. I. ovato-lanceolata  $2\frac{1}{2}$  mm. longa 1 mm. lata apice obtuse acuminata basi plus minus contracta glabra dorso 1-nervata 1-costata ad costam hirsuto-scabra; gl. II. conformis; gluma florens oblonga  $1\frac{1}{2}$  mm. longa 1 mm. lata subconvoluta-concava apice truncata denticulata 3–5-nervata glabra dorso medio arista hirsuta scabra instructa, glabra vel ad basin hirsuta; rhachilla supra glumas I. et II. brevissima haud producta hirsuta; palea 0. Stamina 3, antheris linearibus.

*A. alba* HAYATA Fl. Mont. Formos. (non LINN.).

HAB. Randaizan (No. 7062); in montibus centralibus, leg. U. MORI et S. KOTO.

Near *A. canina*, but differs from it in having much shorter awns of the glume III.

3. ***Agrostis sozanensis*** HAYATA sp. nov. (Fig. 52). Culmus caespitosus 50–60 cm. longus glaber. Folia radicalia non visa; caulina: lamina linearis 9–10 cm. longa 3 mm. lata apice acuminata supra scabra basi haud vel vix contracta, ligula 3 mm. longa totiusque lata apice truncata, vagina 3–5 cm. longa. Panicula 13 cm. longa 5–6 cm. lata, ramis primariis inferioribus 4–5 fasciculatis rectis gracilibus ascendentibus, fasciculis alternis a se

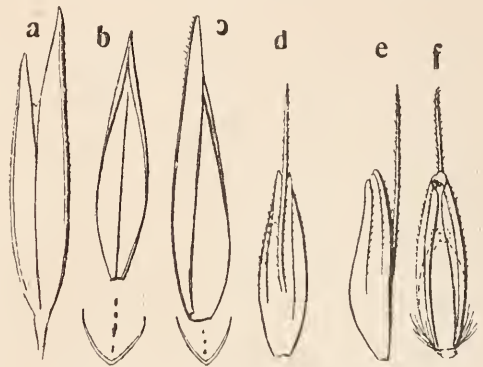


Fig. 51, *Agrostis transmorisonensis* HAYATA. a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume; e, the same, seen from side; f, the same glume, seen from front.

2-3 cm. remotis, ramulis secundariis rectis vel plus minus crispatis scabris. Gl. I. oblonga 2 mm. longa  $\frac{2}{3}$  mm. lata apice acuminata basi contracta dorso scabra. Gl. II. conformis paulo minor. Gl. florens oblonga apice obtusa 5-nervia semi-hyalina basi breve hirsuta dorso medio arista scabra  $1\frac{1}{2}$  mm. longa instructa. Palea O.

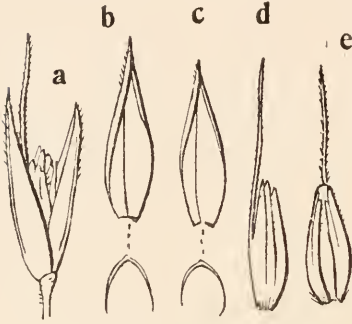


Fig. 52, *Agrostis sozanensis* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume; e, the same, seen from front.

HAB. Sōzan, Taihoku.

Near *A. perennans* TUCK, but differs from it in having awned glumes III.

4. ***Agrostis morrisonensis* HAYATA sp. nov.** (Fig. 53). Culmus cæspitosus erectus rectus 20-45 cm. longus glaber laevis. Folia basi et inferiore caulis disposita, lamina convoluta-filiformi 8-10 cm. longa explicato  $\frac{4}{5}$  mm.

lata basi haud contracta supra (intus) minute hirsuta subtus (extus) glabra; ligula oblongo-triangularis 1 mm. longa totiusque lata apice truncata, vagina 2-5 cm. longa. Panicula 5-10 cm. longa laevis, ramis primariis fasciculatis rectis ascendentibus vel patentibus, fasciculis alternis, ramulis secundariis plus minus crispatis vel rectis; gl. I. oblonga 2 mm. longa  $\frac{2}{3}$  mm. lata apice obtusa 1-nervia dorso carinata ad carinas scaberrima; gl. II. conformis; gluma florens oblonga  $1\frac{1}{2}$  mm. longa glabra 5-nervia convoluta apice truncata dentata hyalina haud aristata.

*Agrostis Clarkei* HAYATA Fl. Mont. Formos. p. 237 (non Hook. f.).

HAB. in Monte Morrison, ad 12000 ped. alt.

Near *A. flaccida*, but differs from it in having awnless glume III. Also differs from *A. Clarkei* Hook. f. in having nearly equal I. and II. glumes.

5. ***Agrostis perennans* TUCK.; HAYATA Gen. Ind. Fl. Formos. p. 93**  
*A. canina* L. var. *formosana* HACK.; MATSUM. et HAYATA l.c. p. 535.

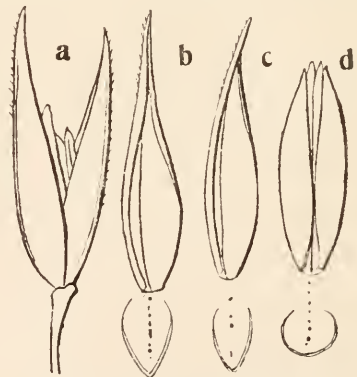


Fig. 53, *Agrostis morrisonensis* HAYATA. a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume.

LI. *Muehlenbergia* SCHREB.

***Muehlenbergia arisanensis* HAYATA** sp. nov. (Fig. 54). Caulis 60–90 cm. longus gracillimus rectus erectus basi paucis repens, internodiis inferioribus 5 cm. longis teretibus glabris lævibus, ad nodos radicans a basi usque ad medium remote foliatus sursum haud foliatus. Folia mediana linearia a se 5



Fig. 54, *Muehlenbergia arisanensis* HAYATA. a, a spikelet; b, gl. I.; c, gl. II.; d, gl. III.; e, f, g, glume IV., seen from different sides; h, i, a stamen, seen from different sides; j, a caryopsis.

cm. distantia circ. 10 cm. longa 4 mm. lata apice acuminata basi contracta ad basin hirsuta cæterem glabra utraque pagine margineque scaberrima, ligula  $\frac{1}{2}$  mm. longa 2 mm. lata hyalina apice truncata hirsuto-ciliata, vagina 6 cm. longa haud hirsuta plus minus scabra. Panicula cylindrica 18 cm. longa, ramis primariis scabris alternis 2–3-fasciculatis ascendentibus ad rhachin paniculæ fere contactis 2–3 cm. longis, fasciculis 1–2 cm. remotis. Spiculæ generaliter sed haud semper geminatim secus rhachin ramulorum panicularum dispositæ, altera longiore altera brevior pedicellata, pedicellis brevioribus  $\frac{1}{3}$  mm. longis, longioribus 1 mm. longis scabris; gluma I. ovata semi-hyalina  $\frac{1}{2}$ – $\frac{1}{3}$  mm. longa apice obtusa glabra; gluma II. semihyalina oblonga  $1\frac{2}{3}$  mm. longa obtusa cum gl. I. persistens; gluma III. lanceolata 2 mm. longa  $\frac{2}{3}$  mm. lata apice acuminata 2-dentata, inter dentes arista 8 mm. longa scabra instructa dorso 3-costata purpurea ad costas scabra basi hirsuta; gluma IV. lanceolata apice acuminata 2 mm. longa purpurea basi hirsuta 2-costata, ad costas scabrida, basi dorso hirsuta; palea O. Anthera ellipsoidea.

Caryopsis ellipsoidica  $1\frac{1}{3}$  mm. longa  $\frac{1}{3}$  mm. lata longitudinaliter rugulosa.

HAB. in monte Arisan, ad 2500 m. alt., leg. U. FAURIE, Dec. 1914.

Near *M. japonica* STEUD., but differs from it in having far much smaller I. and II. glumes.

LII. *Calamagrostis* ADANS.

1. Branches of panicles much contracted, spikelets much narrower, densely clustered..... 1. *C. Epigejos* var. *densiflora*.  
Branches of panicles not contracted, spikelets not clustered, densely or very laxely arranged. .... 2
2. Branches or branchlets of panicles straight, spikelets densely arranged. .... 2. *C. formosana*.  
Branches or branchlets of panicles flexuous, spikelets few, loosely arranged. .... 3. *C. morrisonensis*.

1. **Calamagrostis Epigejos** ROTH. var. **densiflora** LEDEB.; MATSUM. et HAYATA l.c. p. 536.

2. **Calamagrostis formosana** HAYATA sp. nov. (Fig. 55). Culmus 70–80 cm. altus glaber et lævis erectus rectus teres. Folia radicularia non visa; caulina: lamina linearis 30–40 cm.

longa 6–7 mm. lata apice acuminata basi vix attenuata plus minus scabra, vagina 14 cm. longa caulem amplexantia, ligula magna 8 mm. longa 5 mm. lata membranacea. Panicula terminalis cylindrica 20 cm. longa 4 cm. lata; rhachis teres recta, ramis rectis ascendentibus primariis 5–6 fasciculatis, fasciculis alternis circ. 5 cm. longis, inferioribus a se 1–3 cm. remotis rectis, ramulis secundariis 2–3 fasciculatis, fasciculis alternis plus minus scabris, pedicellis ultimis 1–2 mm. longis scabris. Spiculæ pallido-violascentes

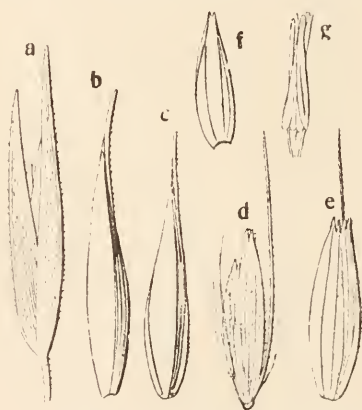


FIG. 55, *Calamagrostis formosana* HAYATA. a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume with its palea; e, the same glume; f, a palea; g, stamens.

vel non coloratæ. Gl. I. lanceolata  $4\frac{1}{2}$  mm. longa 1 mm. lata apice acuminata subglabra dorso versus apicem plus minus carinata scabra; gluma II. fere conformis; gl. florens hyalina 5-nervosa 3 mm. longa oblonga 1 mm. lata apice truncata denticulata dorso prope basin arista una instructa, arista 4 mm. longa haud torta scabra, palea hyalina lanceolata  $2\frac{1}{2}$  mm. longa haud carinata; rhacheola supra glumas I. et II. brevissima longe pilosa, pilis  $2\frac{1}{2}$  mm. longis patentibus. Stamina 3.

*Calamagrostis arundinacea* HAYATA Fl. Mont. Formos. p. 237 (non ROTH.).

HAB. Hakkutaisan, leg. U. MORI, Sept. 1910, (typus); Arisan, ad 2500 m. alt., leg. U. FAURIE; Mt. Morrison, leg. U. MORI.

Near *C. arundinacea*, ROTH.; but differs from it in the hairs on the callus of the glume III. which hairs are in this new species longer than or equal to the glume itself; but in *C. arundinacea* they are much shorter than the gl. III.

3. ***Calamagrostis morrisonensis*** HAYATA sp. nov. (Fig. 56). Culmus 50–60 cm. altus glaber teres gracilis erectus. Folia ad partem inferiorem caulis disposita radicalia non visa; caulina: lamina linearis 15–20 cm. longa 3–4 mm. lata acuminata basi auriculata subtus glabra supra minute hirsuta, ligula membranacea  $\frac{1}{2}$  mm. longa 2 mm. lata margine integra, vagina 2–3 cm. longa. Panicula terminalis gracilis 8–10 cm. longa 3–4 cm. lata, ramis primariis 2–3-fasciculatis, fasciculis alternis a se 1–2 cm. remotis, ramis et ramulis crispatis plus minus scabris. Gluma I. lanceolata 4 mm. longa 1 mm. lata apice acuminata dorso sursum 1-carinata ad carinas scabra. Gluma II. conformis 3-nervia subglabra. Rhachilla supra glumas I. et II. longe hirsuta, pilis 2–3 mm. longis. Gluma florens oblongo-lanceolata apice truncata ad summum denticulata basi plus minus contracta subglabra prope basin arista 4 mm. longa instructa, aristis scabris. Palea oblongolanceolata  $2\frac{1}{2}$  mm. longa apice obtusa.

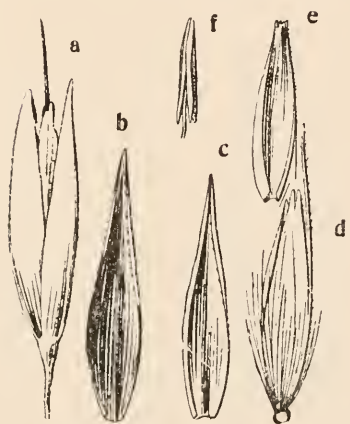


Fig. 56, *Calamagrostis morrisonensis* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume with its palea; e, a palea; f, a stamen.

*C. arundinacea* ROTH. var. *nipponica* HAYATA (non HACK.) Fl. Mont. Formos. p. 237.

*C. formosana* HAYATA var. *pauciflora* HAYATA Gen. Ind. Fl. Formos. p. 95.

HAB. in monte Morrison, ad 13000 ped. alt., typus!

Near *Calamagrostis formosana* HAYATA, but differs from it in the much smaller form with much looser panicles and curled branches, and in the leaves with auricled base, much shorter ligules and the hairy upper surface.



LIII. *Aira* LINN.

**Aira Kawakamii** HAYATA in Bot. Mag. (Tōkyō) XX. p. 47.

LIV. *Deschampsia* BEAUV.

**Deschampsia cæspitosa** BEAUV.; HAYATA Fl. Mont. Formos. p. 238.

**Deschampsia flexuosa** TRIN.; HAYATA Fl. Mont. Formos. p. 238.

LV. *Avena* LINN.

**Avena fatua** LINN.; FORBES et HEMSL. Ind. Fl. Sin. III. p. 401.

HAB. Akō, leg. MATSUDA, Aprili. 1915.

LVI. *Trisetum* PERS.

**Trisetum subspicatum** BEAUV.; HAYATA Fl. Mont. Formos. p. 238.

LVII. *Enteropogon* NEES.

**Enteropogon gracilior** RENDLE in HEMSL. Ind. Fl. Sin. III. p. 403;  
MATSUM. et HAYATA Enum. Pl. Formos. p. 537.

HAB. Takao, leg. T. SOMA, Dec. 1911.

LVIII. *Tripogon* ROTH.

**Tripogon chinensis** HACK.; MATSUM. et HAYATA l.c. p. 540.

LIX. *Cynodon* PERS.

**Cynodon Dactylon** PERS.; MATSUM. et HAYATA l.c. p. 536.

LX. *Chloris* SWARTZ.*Key to species.*

1. Spikes 5–6 cm. long 3 mm. broad. .... *C. barbata*.  
Spikes much slenderer, 10–15 cm. long, 2 mm. broad.... *C. incompleta*.

**Chloris barbata** SWARTZ.; MATSUM. et HAYATA l.c. p. 537.

**Chloris incompleta** ROTH.; MATSUM. et HAYATA l.c. p. 538.

LXI. *Eleusine* GÆRTN.*Key to species.*

- Leaves broad. .... 1. *E. coracana*.  
Leaves narrow..... 2. *E. indica*.

1. **Eleusine coracana** GÆRTN.; MATSUM. et HAYATA l.c. p. 538.

2. **Eleusine indica** GÆRTN.; MATSUM. et HAYATA l.c. p. 538.

LXII. *Dactyloctenium* WILLD.

**Dactyloctenium ægyptiacum** WILLD.; MATSUM. et HAYATA l.c. p. 537.

LXIII. *Leptochloa* BEAUV.**Leptochloa chinensis** NEES., MATSUM. et HAYATA. l.c. p. 539.LXIV. *Arundo* LINN.*Key to species.*

Leaves broader, glumes I. and II. nearly 1 cm. long, tall grass.

..... 1. *A. Donax*. var. *coleotricha*.

Leaves narrower, glumes I. and II. 3-4 mm. long; smaller grass.

..... 2. *A. formosana*.1. **Arundo Donax** LINN. var. **coleotricha** HACK.; MATSUM. et HAYATA l.c. p. 540.2. **Arundo formosana** HACK.; MATSUM. et HAYATA l.c. p. 540.*A. formosana* HACK. var. *gracilis* HACK.LXV. *Phragmites* TRIN.*Key to species.*Panicle and glumes not spreading much..... 1. *P. communis*.Panicle and glumes spreading much ..... 2. *P. Karka*.1. **Phragmites communis** TRIN.; MATSUM. et HAYATA l.c. p. 541.2. **Phragmites Karka** TRIN. MATSUM. et HAYATA l.c. p. 541.LXVI. *Eragrostis* BEAUV.*Key to species.*

1. Spikelets not exceeding 2 mm. in length, axis of spikelets articulate. 2

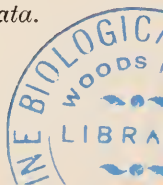
Spikelets more than 2 mm. in length, axis of spikelets not articulate ... 3

2. Palea not ciliate at the margin..... 1. *E. interrupta* var. *tenuissima*.Palea long ciliate at the margin ..... 2. *E. tenella*.3. Mature spikelets not exceeding  $1\frac{1}{2}$  mm. in breadth..... 4Mature spikelets more than  $1\frac{1}{2}$  mm. in breadth ..... 54. Glumes narrower and acute at the apex ..... 3. *E. pilosa*.Glumes broader and obtuse or rounded at the apex ..... 4. *E. minor*.5. Panicles cylindrical..... 5. *E. geniculata*.

Panicles more or less diffuse ..... 6

6. Spikelets nearly 3 mm. in breadth..... 7

Spikelets less than 3 mm. broad..... 8

7. Spikelets usually purple toward the tip ..... 6. *E. elongata*.

- Spikelets gray or dark-colored, palea shortly hairy at the margin, but not ciliate, glume I. quite obtuse but not apiculate at the apex, leaves quite or nearly glabrous ..... 7. *E. atrovirens*.(=*E. bulbillifera*.)
8. Spikelets smaller very brown, glume I nearly rounded very obtuse.....  
..... 8. *E. Makinoi*.  
Spikelets larger, gray or slightly brown, glume I. oblong less obtuse... 9
9. Spikelets slightly brown, palea distinctly ciliate, caryopsis rounded.  
..... 9. *E. major*.  
Spikelets slightly purple, palea less ciliate, caryopsis elliptical.....  
..... 10. *E. amabilis*=*E. unioloides*=*E. formosana*.
1. **Eragrostis interrupta** BEAUV. var. **tenuissima** STAFF., MATSUM. et HAYATA l.c. p. 543.  
*E. japonica* TRIN.
2. **Eragrostis tenella** ROEM.; HAYATA Gen. Ind. Fl. Formos. p. 96.  
*E. plumosa* LINK.; MATSUM. et HAYATA l.c. p. 545.
3. **Eragrostis pilosa** BEAUV.; l.c. p. 544.
4. **Eragrostis minor** HOST. l.c. p. 544.
5. **Eragrostis geniculata** NEES et MEY; l.c. p. 543.
6. **Eragrostis elongata** JACQ. l.c. p. 542.
7. **Eragrostis atrovirens** TRIN.; HAYATA Gen. Ind. Fl. Formos. p. 96.  
*E. bulbillifera* STEUD.; MATSUM. et HAYATA l.c. p. 542.
8. **Eragrostis Makinoi** HACK.; MATSUM. et HAYATA l.c. p. 544.
9. **Eragrostis major** HOST.; MATSUM. et HAYATA l.c. p. 543.
10. **Eragrostis amabilis** WRIGHT et ARN.; HAYATA Gen. Ind. Fl. Formos. p. 96.  
*E. formosana* HAYATA Mater. Fl. Formos. p. 408.  
*E. unioloides* NEES.; MATSUM. et HAYATA l.c. p. 545.

#### LXVII. *Diplachne* BEAUV.

**Diplachne fusca** BEAUV.; MATSUM. et HAYATA l.c. p. 438.

#### LXVIII. *Lophatherum* BRONGN.

**Lophatherum gracile** BRONGN.; MATSUM. et HAYATA l.c. p. 546.

LXIX. *Centotheca* DESV.*Key to species.*

Flowering glumes with reflexed submarginal bristles ... 1. *C. lappacea*.

Flowering glumes with no bristle ..... 2. *C. lappacea* var. *inermis*.

1. ***Centotheca lappacea*** DESV.; MATSUM. et HAYATA l.c. p. 546.

2. ***Centotheca lappacea*** DESV. var. ***inermis*** RENDL; MATSUM. et HAYATA l.c. p. 546.

LXX. *Poa* LINN.

***Poa annua*** LINN.; MATSUM. et HAYATA l.c. p. 547.

***Poa palustris*** LINN. l.c. p. 547.

***Poa*** spp.

LXXI. *Festuca* LINN.

***Festuca ovina*** LINN. var. ***vulgaris*** KOCH.; HAYATA Fl. Mont. Formos. p. 240.

LXXII. *Brachypodium* BEAUV.*Key to species.*

Spikelets mostly quasiterminal solitary..... 1. *B. Kawakamii*.

Spikelets spicate ..... 2. *B. formosanum*.

1. ***Brachypodium Kawakamii*** HAYATA Fl. Mont. Formos. p. 237, t. 40.

2. ***Brachypodium formosanum*** HAYATA sp. nov. (Fig. 57) Perennis. Culmus gracillimus 50–80 cm. altus erectus plus minus curvatus basi plus minus repens, internodiis 4 cm. longis, glaber lævis. Folia versus basin caulis disposita linearia 15 cm. longa 7 mm. lata apice acuminata utraque glabra lævia, nervis primariis utroque latere costæ 4, venulis secundariis inter nervos primarios 5, haud tessellata, vaginis 5–6 cm. longis culmum amplexantibus tubuliformibus, ligulis membranaceis hirsutis 2 mm. longis  $3\frac{1}{2}$  mm. latis. Spiculæ versus apicem caulis spicatum alternatim remoteque dispositæ sessiles, rhachis semi-teres ad nodos tenuiter hirsuta; spiculæ lineari-lanceolatæ 2–2 $\frac{1}{2}$  cm. longæ 3–4 mm. latæ 5–7-floratæ latere complanatæ. Gl. I. minuta triangulari-lanceolata 2 mm. longa acuta vel obtusa 3-nervata, nervis dorso elevatis, vacua; gl. II. vacua triangulari-lanceolata 5 mm. longa apice acuminata 5–7-nervata glabra. Glumæ florentes 5–7, inferior lanceolata

1 cm. longa  $2\frac{1}{2}$ –3 mm. lata apice acuminata basi obtusa callo annulari instructa 7-nervia extus rugosa intus lævis apice ad aristam 8 mm. longam scabram abeuns. Palea quam gluma florens pauce brevior 8 mm. longa, inter carinas  $1\frac{1}{2}$  mm. lata apice truncata basi obtusa 2-carinata ad carinas ciliata secus carinas interiore plicata. Caryopsis linearis 4–5 mm. longa 1 mm. lata apice villosa.

*Brachypodium sylvaticum* HAYATA  
Fl. Mont. Formos. p. 240 (non ROEM.  
et SCHUTT.)

HAB. in monte centrali, Haknuta-san, typus; Mt. Morrison, 12000 ped alt.; inter Ushōkō et Arisan.

Near *B. sylvaticum* ROEM. et SCHUTT., but distinguishable from it in having much narrower leaves and not ciliolate rhachilla of the spikelets.

LXXIII. *Lepturus* R. BR.

*Lepturus repens* R. BR.; MATSUM.  
et HAYATA l.c. p. 548.

LXXIV. *Triticum* LINN.

*Triticum vulgare* VILL.; MATSUM.  
et HAYATA, l.c. p. 548.

LXXV. *Arundinaria* MICHX.

*Arundinaria Kunishii* HAYATA  
Ic. Pl. Formos. VI. p. 136.

*Arundinaria naibunensis* HAYATA  
Mater. Fl. Formos. p. 408.

*Arundinaria niitakayamensis*  
HAYATA in Tokyo Bot. Mag. XXI. p. 49.

*Arundinaria oiwakensis* HAYATA Ic. Pl. Formos. VI. p. 137.

*Arundinaria Usawai* HAYATA Ic. Pl. Formos. VI. p. 138.

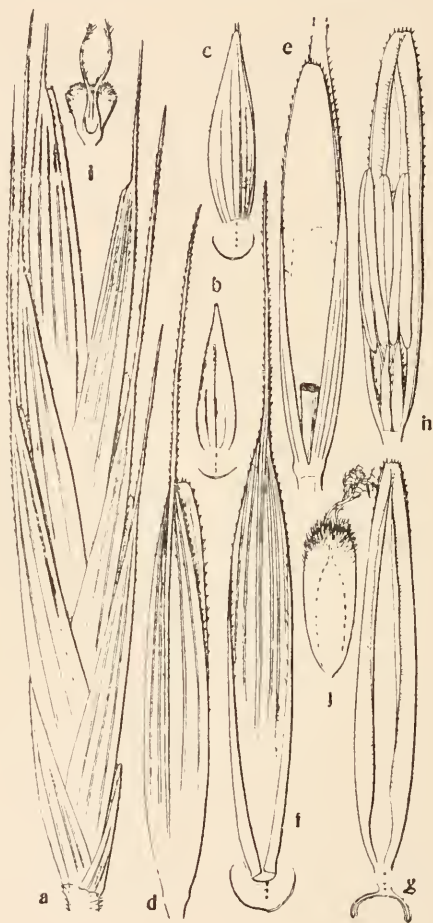


Fig. 57, *Brachypodium formosanum* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume with its palea; e, the same, seen from a different side; f, the same glume; g, the same palea; h, the same palea with stamens; i, ovary; j, a young caryopsis.



LXXVI. *Phyllostachys* SIEB. et ZUCC.*Phyllostachys formosana* HAYATA Ic. Pl. Formos. VI. p. 140.*Phyllostachys lithophila* HAYATA Ic. Pl. Formos. VI. p. 141.*Phyllostachys Makinoi* HAYATA Ic. Pl. Formos. V. p. 250.*Phyllostachys nigripes* HAYATA Ic. Pl. Formos. VI. p. 142.*Phyllostachys pubescens* H. LEHL.; HAYATA Ic. Pl. Formos. VI. p. 140.*P. edulis*.LXXVII. *Bambusa* SCHREM.*Bambusa breviflora* MUNRO; HAYATA Ic. Pl. Formos. VI. p. 143.*Bambusa dolichoclada* HAYATA l.c. p. 144.*Bambusa dolichomerithallina* HAYATA l.c. p. 146.*Bambusa Fauriei* HACK. HAYATA l.c. p. 148.*Bambusa nana* ROXB.; MATSUM. et HAYATA l.c. p. 549.*Bambusa Oldhami* MUNRO; HAYATA l.c. p. 150.*Bambusa pachinensis* HAYATA l.c. p. 150.*Bambusa Shimadai* HAYATA l.c. p. 151.*Bambusa stenostachya* HACK.; HAYATA l.c. p. 152.*Bambusa tuldoidea* MUNRO; HAYATA l.c. p. 153.

The occurrence of *B. angulata* MUNRO and *B. Ridleyi* GAMBLE in the island is very doubtful.

LXXVIII. *Dendrocalamus* NEES.*Dendrocalamus latiflorus* MUNRO; MATSUM. et HAYATA l.c. p. 551.LXXIX. *Schizostachyum* NEES.

*Schizostachyum acutiflorum* MOORE? HAYATA in Gen. Ind. Fl. Formos. p. 99.

## Polypodiaceæ.

*Polystichum* ROTH.

*Polystichum Morii* HAYATA sp. nov. (Fig. 58). Rhizoma? Stipes 6 cm. longus gracillimus basi sursum parce squamatus, squamis lanceolatis 1 mm. longis acuminatis. Frons coriacea in ambitu linearis vel lineari-lanceolata 6 cm. longa 1 cm. lata apice acuminata basi truncata pinnata, pinnis infimis maximis superioribus gradatim minoribus patentibus vel in-

ferioribus interdum reflexis, mediis rectangularibus 7 mm. longis 3 mm. latis apice obtusis valde obliquis latere inferiore angustioribus latere superiore latioribus 2 mm. latis; basi latere inferiore cuneato-acutis latere superiore basi late truncatis margine serratis, serris cuspidiformibus triangularibus aristatis validissimis; pagine utraque glabra; rhachis frondis recta supra sulcata squamis lineari-filiformibus sparce conspersa. Sporangia 3 ad paginam

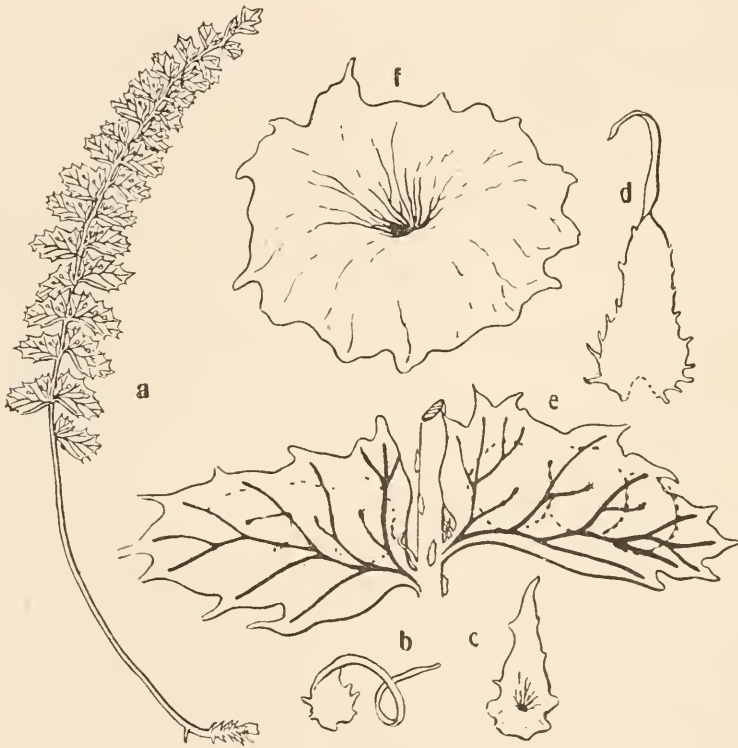


Fig. 58, *Polystichum Morii* HAYATA; a, the plant; b, c, d, various scales on the stipe and frond; e, pinnæ; f, an indusium.

inferiorem pinnae singulae. Indusia majora peltata 2 mm. in diametro margine denticulata. Pinnis a se 3-4 mm. remotis.

HAB. Mt. Morrison, ad 10000 ped. alt., leg. U. MORI, Dec. 1908.

Near *P. simplicipinnum* HAY.; but differs from it in having much smaller pinnæ which are much shorter and more rounded than those of *P. simplicipinnum*. This is the smallest one of all the species of *Polystichum*.

## Selaginellaceæ.

*Selaginella* SPRING.*Key to the species.*

1. Bracts of spikes uniform ..... 2  
    Bracts of spikes dimorphous..... 8
2. Stem decumbent, spikes very short..... 1. *S. kelungensis*.  
    Stem ascendent or erect..... 3
3. Stem densely tufted ..... 2. *S. involvens*.  
    Stem not tufted ..... 4
4. Leaves entire ..... 3. *S. canaliculata*.  
    Leaves more or less serrulate ..... 5
5. Branches with leaves on both sides more than 5 mm. broad .....  
    ..... 4. *S. atroviridis*.  
    Branches or branchlets with leaves on both sides less than 3 mm.  
    broad..... 6
6. Macrospores winged..... 5. *S. caulescens*.  
    Macrospores wingless..... 7
7. Leaves membranaceous .....  
    ..... 6. *S. subcaulescens*.  
    Leaves thicker. 7. *S. pseudo-involvens*.
8. Branches or branchlets with leaves on both  
    sides nearly 7 mm. broad. 8. *S. Somai*.  
    Branches or branchlets with leaves on both  
    sides less than 4 mm. broad..... 9
9. Ventral leaves narrowly ovate .....  
    ..... 9. *S. morrisonensis*.  
    Ventral leaves broadly ovate. .... 10
10. Spikes wider. .... 10. *S. leptophylla*.  
    Spikes narrower. ... 11. *S. stenostachya*.

1. *Selaginella kelungensis* HAYATA

sp. nov. (Fig. 59). Caulis decumbens ad totam longitudinem radicibus instructus ramosus toto foliatus 10–30 cm. longus. Folia dimorpha



Fig. 59, *Selaginella kelungensis* HAYATA; a, apical portion of a branch; b, a dorsal leaf; c, a ventral leaf.

membranacea remota; folia dorsalia minora oblique cuspidato-ovata 2 mm. longa 1 mm. lata apice acuminata haud aristata plus minus recurva basi obliqua latere exteriori auriculata latere interiori haud vel leviter auriculata margine minute serrulata ad caulem adpresse disposita ascendencia; folia ventralia majora oblique ovata  $2\frac{1}{2}$  mm. longa  $1\frac{1}{2}$  mm. lata apice obtuse acuta basi oblique rotundata margine minute serrulata vel subintegra. Spicæ brevissimæ 3 mm. longæ, bracteis uniformibus; bracteis lanceolato-ovatis 2 mm. longis acuminatis basi rotundatis margine minute serrulatis. Macrosporangium infimum; macrosporis subglobosis  $\frac{1}{2}$  mm. in diametro elevato-reticulatis; microsporangia superiora ellipsoidea  $\frac{2}{3}$  mm. longa  $\frac{1}{3}$  mm. lata apice rotundata basi leviter 2-lobata.

HAB. Monte centrali, leg. U. MORI

Dec. 1908; Shichiseitonzan, leg.

Y. SHIMADA; Kelung, leg. T. SOMA;

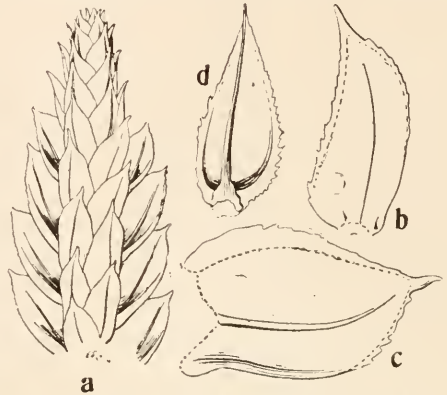


Fig. 60, *Selaginella involvens* SPRING; a, apical portion of a branch; b, a dorsal leaf; c, a ventral leaf; d, a bract.

Chikushiko, leg. S. NAGASAWA.

Near *Selaginella concinna* SPR., but differs from it in having much acuter leaves and bracts.

2. ***Selaginella involvens*** SPRING. (Fig. 60);

BAKER Fern All. p. 87; MATSUM. et HAYATA Enum. Pl. Formos. p. 553.

HAB. Kussaku-Urai, Maruyama.

3. ***Selaginella canaliculata*** BAKER (Fig.

61); Fern All. p. 91; MATSUM. et HAYATA Enum. Pl. Formos. p. 552.

HAB. Ōchobi; Bonbonzan; Kappanzan; Hirananzan; Pachina; Kussaku; Kōtōshō; Kelung; Karapin.

Widely spread over all the island. Same as the Hongkong form.

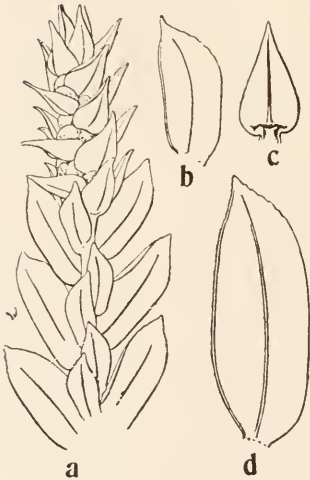


Fig. 61, *Selaginella canaliculata* BAKER; a, apical portion of a branch with a spike; b, a dorsal leaf; c, a bract; d, a ventral leaf.

4. **Selaginella atroviridis** SPRING (Fig. 62); BAKER Fer. All. p. 77; MATSUM. et HAYATA Enum. Pl. Formos. p. 552.

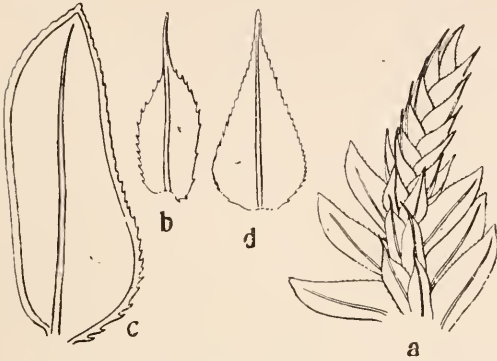


Fig. 62, *Selaginella atroviridis* SPRING; a, apical portion of a branch; b, a dorsal leaf; c, a ventral leaf; d, a bract.

Enum. Pl. Formos. p. 552.

HAB. Suichōryu.

6. **Selaginella subcaulescens** HAYATA sp. nov. (Fig. 64). Planta 20–40 cm. longa. Caulis ascendento-erectus medio sursum ramosus a basi usque ad supra medium eramosus teres pallido-stramineus squamis adpressis instructus, squamis lanceolato-triangularibus  $2\frac{1}{2}$  mm. longis 1 mm. latis apice cuspidato-acuminatis; partibus caulis ramosis in ambitu ovato-lanceolatis 10–20 cm. longis, ramis juxta infimos longissimis ramosissimis; ramulis cum foliis  $2-2\frac{1}{2}$  mm. latis. Folia dimorpha dorsi-ventraliter disposita; folia dorsalia minora oblique cuspidato-ovata ascendentia cum cuspidibus 1 mm. longa  $\frac{1}{2}$  mm. lata apice cuspidata, cuspidibus  $\frac{1}{3}$  mm. longis, basi oblique cordata vel haud cordata margine aristato-serrulata; folia ventralia majora patentia contigua oblique oblango-ovata  $1\frac{1}{2}$  mm. longa  $\frac{2}{3}$  mm. lata versus apicem superiore falcata margine subintegra sed latere superiore versus basin minute serrulata. Spicæ  $\frac{1}{2}$ –1 cm. longæ tetragonæ plus minus complatæ cum bracteis 2 mm. latæ; bracteis uniformibus cuspidato-ovatis  $1\frac{1}{4}$  mm. longis  $\frac{2}{3}$  mm. latis apice cuspidatis valde costatis margine serrulatis;

HAB. Taitonzan; Suiteiryō; Kokei; Shintengai.

I have seen a specimen of this species from Hongkong. It is a little different from our plant in the leaves which are in the Hongkong specimen more or less muricate on the upper surface.

5. **Selaginella caulescens** SPRING (Fig. 63); BAKER Fern. All. p. 94; MATSUM. et HAYATA

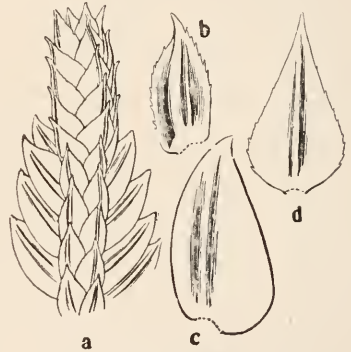


Fig. 63, *Selaginella caulescens* SPRING; a, apical portion of a branch; b, a dorsal leaf; c, a ventral leaf; d, a bract.





Fig. 64, *Selaginella subcaulescens* HAYATA; a, a portion of a branch with a spike; b, a ventral leaf; c, a dorsal leaf; d, a bract.

macrosporis haud alatis impresso-reticulatis.

HAB. Kussaku, Shintengai; Kōshūn, Tamsui Agiyoku, Kelung, Matō, Kyūkyokudō.

Very near *S. caulescens*, but distinguishable from it by the much thinner leaves and wingless macrospores.

7. *Selaginella pseudo-involvens* HAYATA sp. nov. (Fig. 65). Planta erecta 15-20 cm. alta ad saxum crescens solitaria vel 2-3 aggregata. Caulis ascendento-erectus usque ad supra medium eramosus teres stramineo-rubescens minus quam 1 mm. in diametro squamis adpressis

conspersis instructus, squamis lanceolato-triangularibus 2 mm. longis acutis basi peltatis et fimbriatis approximatis fere imbricatis; partibus caulis ramosis triangularibus vel pentagonis 6-8 cm. in diametro, ramis (pinnis) patentibus vel ascendentibus angulo  $45^{\circ}$  a cauli egressis; ramulis vel pinnulis cum foliis  $1\frac{1}{2}$ -2 mm. latis. Folia dimorpha dorsi-ventraliter disposita; folia dorsalia minora crassiuscula oblique lanceolata cum cuspidibus  $1\frac{1}{4}$  mm. longa  $\frac{1}{4}$  mm. lata apice acuminata aristata, aristis  $\frac{1}{4}$  mm. longis, basi subtruncata margine integra; folia ventralia majora oblique ovata  $1\frac{2}{3}$  mm. longa  $\frac{3}{4}$  mm. lata apice cuspidato-aristata, aristis  $\frac{1}{5}$  mm. longis, latere interiore crassiuscula integra latere superiore membranacea serrulata basi plus minus contracta. Spicæ ad apicem ramulorum terminales erectæ rectæ  $1\frac{1}{2}$ -2 cm. longæ tetragonæ plus minus complanatæ  $1\frac{1}{2}$ -2 mm. latæ, bracteis uniformibus ovatis cuspidato-aristatis  $2\frac{1}{2}$  cm. longis  $1\frac{1}{4}$  mm. latis versus costam incrassatis ad marginem imbricatis margine denticulatis basi contractis leviter peltatis.

HAB. inter Busegan et Seisui, leg. S. SASAKI et B. HAYATA, Mai. 1917.

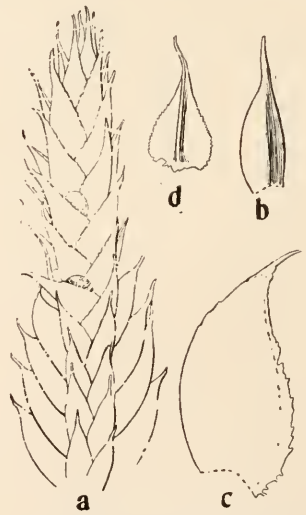


Fig. 65, *Selaginella pseudo-involvens* HAYATA; a, a portion of a branch with a spike; b, a dorsal leaf; c, a ventral leaf; d, a bract.

Closely resembles in its appearance *Selaginella involvens*; but widely different from it in its solitary stems with much more cuspidate leaves.

8. ***Selaginella Somai* HAYATA** sp. nov. (Fig. 66). Planta decumbens

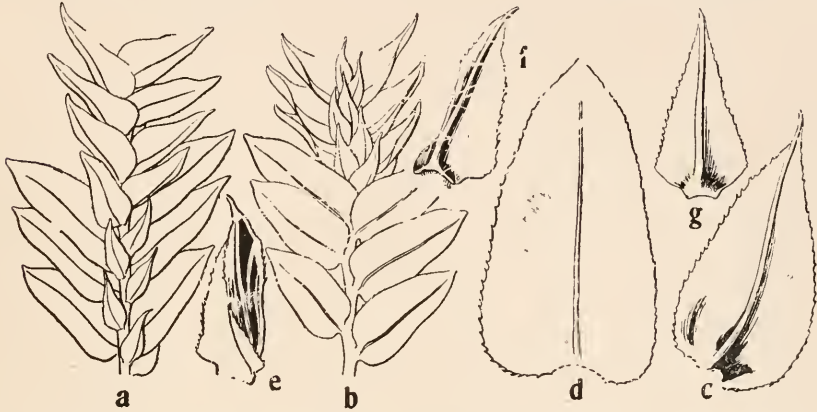


Fig. 66, *Selaginella Somai* HAYATA; a, apical portion of a branch; b, the same, seen from different side; c, a dorsal leaf; d, a ventral leaf; e, f, dorsal leaves of a spike; g, a ventral leaf of a spike.

secus totam longitudinem radicans ramosa. Caulis toto foliatus. Folia dimorpha: dorsalia minora adpresse disposita ascendentia oblique oblongo-ovata 2 mm. longa minus quam 1 mm. lata apice cuspidata basi oblique leviter cordata margine serrulata. Folia ventralia majora patentia oblique ovato-oblonga 3 mm. longa apice acuta basi rotundata obliqua margine serrulata. Spicæ complanatæ resupinatæ 7 mm. longæ 3 mm. latæ; bracteis dimorphis; ventralibus minoribus cuspidato-rhomboidalibus 2 mm. longis 1 mm. latis apice acuminatis basi triangulari obtusis margine serrulatis; dorsalibus majoribus cuspidatis triangularibus 2 mm. longis 1 mm. latis apice acutis basi rotundatis serrulatis oblique costatis, ad costas alatis, alis  $\frac{1}{4}$  mm. longis.



Fig. 67, *Selaginella morisonensis* HAYATA; a, a portion of a branch; b, a dorsal leaf; c, a ventral leaf.

HAB. Kujukusu et Maruyama, leg. T. SÔMA, 1910.

Near *S. proniiflora*, but differs from it in having contiguous leaves and less ciliolate bracts.

9. **Selaginella morrisonensis** HAYATA (Fig. 67). Materials for a Flora of Formosa p. 410.

HAB. Ganzan, ad 9141 pd. alt.

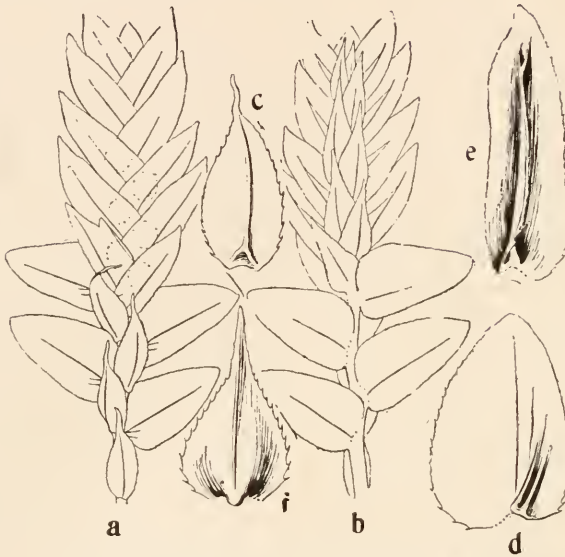


Fig. 68, *Selaginella leptophylla* BAKER; a, a branch with a spike; b, the same, seen from ventral side; c, a dorsal leaf; d, a ventral leaf; e, a dorsal leaf of a spike; f, a ventral leaf of the same spike.

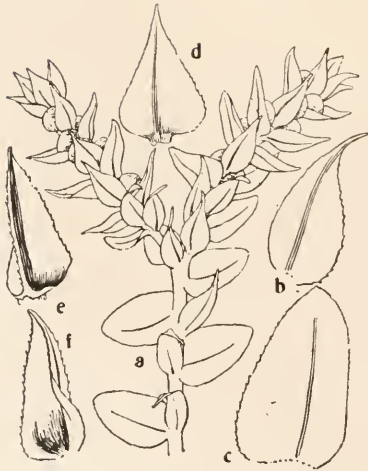


Fig. 69, *Selaginella stenostachya* HAYATA; a, a branch with spikes; b, a dorsal leaf; c, a ventral leaf; d, a ventral leaf of a spike; e, f, dorsal leaves of a spike.

10. **Selaginella leptophylla** BAKER

(Fig. 68). Fern. All. p. 109; MATSUM. et HAYATA Enum. Pl. Formos. p. 553.

HAB. Kelung, Sōzan, Kizan.

11. **Selaginella stenostachya** HA-

YATA (Fig. 69). Ic. Pl. Formos. IV. p. 130.

HAB. Shinkō, Sōseikyaku, Kwarenkō.

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<b>Dendrocalamus</b> NEES. . . . .	95	„ <i>polystachya</i> B. H. et K. . . . .	55
„ <i>latiflorus</i> MUNRO. . . . .	95	„ <i>villosa</i> KUNTH. . . . .	55
<b>Deschampsia</b> BEAUV. . . . .	90	<b>Euchlæna</b> SCHRADE. . . . .	68
„ <i>cæspitosa</i> BEAUV. . . . .	90	„ <i>luxurians</i> DURIËU. . . . .	68
„ <i>flexuosa</i> TRIN... . . . .	90	<b>EUPHORBIACEÆ</b> ... . . . .	34
<b>Digitaria</b> RICH. . . . .	65	<b>Euphorbia</b> LINN. . . . .	34
„ <i>barbata</i> WILLD. . . . .	65	„ <i>tarokoensis</i> HAYATA. . . . .	34
„ <i>formosana</i> RENDLE. . . . .	65	<b>Festuca</b> LINN. . . . .	93
„ <i>Henryi</i> RENDLE. . . . .	65	„ <i>ovina</i> LINN. var. <i>vulgaris</i> KOCH. . . . .	93
„ <i>longiflora</i> PERS. . . . .	65	<b>Ficus</b> LINN. . . . .	35
„ <i>sanguinalis</i> SCOP. . . . .	65	„ <i>kaukauensis</i> HAYATA. . . . .	35
„ <i>violascens</i> LINK. . . . .	65	„ <i>ochobiensis</i> HAYATA. . . . .	36
<b>Diospyros</b> LINN. . . . .	33	„ <i>tannoensis</i> HAYATA. . . . .	36
„ <i>Sasakii</i> HAYATA. . . . .	33	<b>Galium</b> LINN. . . . .	32
<b>Diplachne</b> BEAUV. . . . .	92	„ <i>Morii</i> HAYATA. . . . .	32
„ <i>fusca</i> BEAUV... . . . .	92	„ <i>tarokoense</i> HAYATA. . . . .	33
<b>Dimeria</b> R. BR. . . . .	68	<b>GERANIACEÆ</b> . . . . .	4
„ <i>ornithopoda</i> TRIN. . . . .	68	<b>Geranium</b> LINN. . . . .	4
<b>EBENACEÆ</b> . . . . .	33	„ <i>uniflorum</i> HAYATA. . . . .	4
<b>Eleusine</b> GÆRTN. . . . .	90	<b>GRAMINEÆ</b> . . . . .	43
„ <i>coracana</i> GÆRTN. . . . .	90	<b>Heteropogon</b> PERS... . . . .	82
„ <i>indica</i> GÆRTN. . . . .	90	„ <i>contortus</i> BEAUV. . . . .	82
<b>Enteropogon</b> NEES... . . . .	90	<b>Ichnanthus</b> BEAUV... . . . .	65
„ <i>gracillior</i> RENDLE. . . . .	90	„ <i>pallens</i> MUNRO. . . . .	65
<b>Eragrostis</b> BEAUV... . . . .	91	<b>Imperata</b> CYR. . . . .	68
„ <i>amabilis</i> WRIGHT et ARN... . . . .	92	„ <i>arundinacea</i> CYR. . . . .	68
„ <i>atrovirens</i> TRIN. . . . .	92	<b>Isachne</b> R. BR... . . . .	55
„ <i>bulbillifera</i> STEUD . . . . .	92	„ <i>arisanensis</i> HAYATA. . . . .	57



<b>Isachne</b> australis R. Br... ..	57	<b>Oplismenus</b> compositus ROEM. et SCH. ..	66
„ <i>Clarkei</i> HAYATA. .. .	57	„ undulatifolius BEAUV. ..	66
„ debilis RENDLE. .. .	58	<b>ORCHIDEÆ.</b> .. .	40
„ firmula BÜSE. .. .	57	<b>Oryza</b> LINN. .. .	68
„ heterantha HAYATA... ..	56	„ sativa LINN. .. .	68
„ <i>monticola</i> HACK. .. .	58	<b>Panicum</b> LINN... ..	58
„ <i>myosotis</i> NEES. var. <i>nudiglumis</i> HACK... ..	57	„ acroanthum STEUD. .. .	64
„ <i>pulchella</i> BENTH. .. .	58	„ amplexicaule RUDGE. .. .	61
<b>Ischæmum</b> LINN. .. .	77	„ barbipedum HAYATA. .. .	62
„ angustifolium HACK. .. .	78	„ <i>barbivaginale</i> HAYATA. .. .	58
„ aristatum LINN. var. <i>imberbe</i> HACK. .. .	78	„ brevifolium LINN. .. .	64
„ ciliare RETZ... ..	78	„ Crus-Galli LINN. .. .	60
„ muticum LINN. .. .	78	„ decompositum R. Br. .. .	63
„ Sieboldi MIQ. <i>formosanum</i> HACK. .. .	78	„ distachyum LINN. .. .	60
<b>Juniperus</b> LINN. .. .	39	„ excurrens TRIN. .. .	64
„ <i>formosana</i> HAYATA. .. .	39	„ indicum LINN. .. .	61
<b>Leersia</b> SWARTZ. .. .	68	„ miliaceum LINN. .. .	64
„ <i>hexandra</i> SWARTZ. .. .	68	„ montanum ROXB. .. .	64
<b>Leptochloa</b> BEAUV... ..	91	„ <i>neurodes</i> SCHULT. .. .	64
„ <i>chinensis</i> NEES. .. .	91	„ <i>parvulum</i> TRIN... ..	65
<b>Lepturus</b> R. Br. .. .	94	„ <i>paspaloides</i> HAYATA. .. .	60
„ <i>repeus</i> R. Br... ..	94	„ patens LINN. .. .	64
<b>LILIACEÆ.</b> .. .	41	„ <i>plicatum</i> LAM. .. .	64
<b>Liparis</b> RICH. .. .	40	„ proliferum LAM. .. .	63
„ <i>keitaensis</i> HAYATA. .. .	40	„ prostratum LAM. .. .	60
<b>Lophatherum</b> BRONGN. .. .	92	„ pseudodistachyum HAYATA... ..	60
„ <i>gracile</i> BRONGN. .. .	92	„ punctatum BURM. .. .	59
<b>Mahonia</b> NUTT... ..	1	„ repens LINN. .. .	63
„ <i>tikushiensis</i> HAYATA. .. .	1	„ sarmentosum ROXB. .. .	64
<b>Manisuris</b> LINN. .. .	79	„ <i>semi-alatum</i> KTH. .. .	67
<b>Malachobatus</b> granularis LINN. .. .	79	„ submontanum HAYATA... ..	64
<b>Miscanthus</b> ANDERS. .. .	69	„ <i>suishaense</i> HAYATA. .. .	62
„ <i>japonicus</i> HACK... ..	69	„ <i>villosum</i> LAM... ..	60
„ <i>sinensis</i> ANDERS... ..	69	<b>Paspalum</b> LINN. .. .	53
„ <i>sinensis</i> ANDERS. var. <i>for-</i> <i>mosana</i> HACK. .. .	69	„ <i>akoensis</i> HAYATA. .. .	53
„ <i>transmorrisonensis</i> HAYATA. ..	69	„ distichum LINN. .. .	54
<b>Muehlenbergia</b> SCHRES. .. .	87	„ distichum L. var. <i>anpinense</i> HAYATA... ..	54
„ <i>arisanensis</i> HAYATA. ..	87	„ <i>serobiculatum</i> LINN. .. .	53
<b>Nertera</b> BANKS et SOL... ..	32	<b>Pennisetum</b> PERS. .. .	67
„ <i>nigricarpa</i> HAYATA... ..	32	„ <i>japonicum</i> TRIN. .. .	67
<b>Ophiurus</b> R. RR. .. .	79	„ <i>japonicum</i> TRIN. var. <i>vir-</i> <i>descens</i> MIQ. .. .	67
„ <i>monostachyus</i> PRESL. .. .	79	<b>Perotis</b> AIT. .. .	68
<b>Oplismenus</b> BEAUV... ..	66	„ <i>latifolia</i> AIT. .. .	68
„ <i>Burmanni</i> BEAUV. .. .	66	<b>Photinia</b> LINDE. .. .	30
		„ <i>daphniphylloides</i> HAYATA. ..	30
		<b>Phragmites</b> TRIN. .. .	91

<b>Phragmites communis</b> TRIN. . . . .	91	<b>Rubus</b> LINN. . . . .	4
„ <b>Karka</b> TRIN. . . . .	91	„ <b>aculeatiflorus</b> HAYATA. . . . .	15
<b>Phyllostachys</b> SIEB. et ZUCC. . . . .	95	„ <b>adenotrichopodus</b> HAYATA. . . . .	6
„ <b>formosana</b> HAYATA. . . . .	95	„ <b>alceaefolius</b> POIR. var. <b>emigratis</b>	
„ <b>lithophila</b> HAYATA. . . . .	95	„ <b>Focke</b> . . . . .	10
„ <b>Makinoi</b> HAYATA. . . . .	95	„ <b>arisanensis</b> HAYATA. . . . .	15
„ <b>nigripes</b> HAYATA. . . . .	95	„ <b>arisanensis</b> HAYATA. var. <b>hois-</b>	
„ <b>pubescens</b> H. LEH. . . . .	95	„ <b>haensis</b> HAYATA. . . . .	15
<b>PITTOSPOREÆ</b> . . . . .	1	„ <b>calycinoides</b> HAYATA. . . . .	4
<b>Pittosporum</b> BANKS. . . . .	1	„ <b>conduplicatus</b> DUTHIE. . . . .	15
„ <b>daphniphylloides</b> HAYATA. . . . .	1	„ <b>dolichocephalus</b> HAYATA. . . . .	19
<b>Poa</b> LINN. . . . .	93	„ <b>elegans</b> HAYATA. . . . .	18
„ <b>annua</b> LINN. . . . .	93	„ <b>euphlebophyllus</b> HAYATA. . . . .	19
„ <b>palustris</b> LINN. . . . .	93	„ <b>fasciculatus</b> DUTHIE. . . . .	18
<b>Podocarpus</b> L' HER. . . . .	39	„ <b>floribundo-paniculatus</b> HAYATA. . . . .	6
„ <b>nankoensis</b> HAYATA. . . . .	39	„ <b>formosensis</b> O. KtZ. . . . .	12
<b>Pogonatherum</b> BEAUV. . . . .	79	„ <b>fraxinifolius</b> HAYATA. . . . .	28
„ <b>saccharoides</b> BEAUV. . . . .		„ <b>fraxinifolius</b> POIR. . . . .	29
„ var. <b>monandrum</b> HACK. . . . .	79	„ <b>glanduloso-calycinus</b> HAYATA. . . . .	18
<b>Pollinia</b> . . . . .	72	„ <b>glandulosopunctatus</b> HAYATA. . . . .	26
„ <b>arisanensis</b> HAYATA. . . . .	74	„ <b>Kawakamii</b> HAYATA. . . . .	6
„ <b>ciliata</b> TRIN. . . . .	76	„ <b>kotoensis</b> HAYATA. . . . .	27
„ <b>formosana</b> (HACK.) HAYATA. . . . .	75	„ <b>Lambertianus</b> SER. . . . .	9
„ <b>geniculata</b> HAYATA. . . . .	73	„ <b>lasiniato-stipulatus</b> HAYATA. . . . .	11
„ <b>imberbis</b> NEES. var. <b>Willdenowiana</b> HACK. . . . .	74	„ <b>linearifolius</b> HAYATA. . . . .	22
„ <b>monantha</b> NEES. . . . .	76	„ <b>mingtsensis</b> HAYATA. . . . .	15
<b>Polliniopsis</b> HAYATA. . . . .	76	„ <b>moluccanus</b> HAYATA. . . . .	11
„ <b>Somai</b> HAYATA. . . . .	76	„ <b>Morii</b> HAYATA. . . . .	9
<b>POLYPODIACEÆ</b> . . . . .	95	„ <b>nantoensis</b> HAYATA. . . . .	9
<b>Polypogon</b> DESV. . . . .	82	„ <b>parvi-araliifolius</b> HAYATA. . . . .	24
„ <b>Higegaweri</b> STEUD. . . . .	83	„ <b>parvifraxinifolius</b> HAYATA. . . . .	29
„ <b>monspeliensis</b> DESF. . . . .	83	„ <b>parvipungens</b> HAYATA. . . . .	26
<b>Polystichum</b> ROTH. . . . .	95	„ <b>parvirosaeifolius</b> HAYATA. . . . .	26
„ <b>Morii</b> HAYATA. . . . .	95	„ <b>pectinellus</b> HAYATA. . . . .	4
<b>Quercus</b> LINN. . . . .	37	„ <b>pectinellus</b> MAXIM. var. <b>trilobus</b>	
„ <b>Sasakii</b> KANEHIRA. . . . .	37	„ <b>Koidz.</b> . . . .	4
„ <b>spinosa</b> A. DAVID var. <b>Miyabei</b>		„ <b>pentalobus</b> HAYATA. . . . .	4
„ <b>HAYATA.</b> . . . .	37	„ <b>piptopetalus</b> HAYATA. . . . .	21
„ <b>taroensis</b> HAYATA. . . . .	38	„ <b>randaensis</b> HAYATA. . . . .	12
<b>ROSACEÆ</b> . . . . .	4	„ <b>rarissimus</b> HAYATA. . . . .	25
<b>Rottboellia</b> LINN. . . . .	79	„ <b>Rolfi</b> VIDAL var. <b>lanatus</b> HAYATA. . . . .	10
„ <b>compressa</b> LINN. var. <b>genuina</b>		„ <b>rugosissimus</b> HAYATA. . . . .	11
„ <b>HACK.</b> . . . .	79	„ <b>Shimadai</b> HAYATA. . . . .	9
„ <b>exaltata</b> LINN. var. <b>appendiculata</b> HACK. . . . .	79	„ <b>shinkoensis</b> HAYATA. . . . .	16
<b>RUBIACEÆ</b> . . . . .	32	„ <b>Somai</b> HAYATA. . . . .	19
		„ <b>sphaerocephalus</b> HAYATA. . . . .	21
		„ <b>suishaensis</b> HAYATA. . . . .	6
		„ <b>Swinheei</b> HANCE. . . . .	6

<b>Rubus</b> <i>taiouensis</i> HAYATA. . . . .	15	<b>Spodiopogon</b> <i>Sibiricus</i> TRIN. . . . .	71
„ <i>taiwanianus</i> MATSUM. . . . .	26	„ <i>tainanensis</i> HAYATA. . . . .	71
„ <i>triphyllus</i> THIG. . . . .	22	„ <i>Takeoi</i> HAYATA. . . . .	71
<b>Saccharum</b> LINN. . . . .	77	„ <i>tohoensis</i> HAYATA. . . . .	69
„ <i>Narenga</i> HAM. . . . .	77	<b>Sporobolus</b> R. BR. . . . .	83
„ <i>officinatum</i> LINN. . . . .	77	„ <i>diandrus</i> BEAUV. . . . .	83
„ <i>spontanum</i> LINN. . . . .	77	„ <i>indicus</i> R. BR. . . . .	83
<b>Schizostachyum</b> NEES. . . . .	95	„ <i>virginicus</i> KUNTH. . . . .	83
„ <i>acutiflorum</i> MOORE? . . . . .	95	<b>Stellaria</b> LINN. . . . .	1
<b>SELAGINELLACEÆ</b> . . . . .	97	„ <i>reticulivena</i> HAYATA. . . . .	1
<b>Selaginella</b> SPRING. . . . .	77	<b>TERNSTRÆMIACEÆ</b> . . . . .	2
„ <i>canaliculata</i> BAKER. . . . .	98	<b>Thea</b> LINN. . . . .	2
„ <i>caulescens</i> SPRING. . . . .	99	„ <i>hozanensis</i> HAYATA. . . . .	2
„ <i>involvens</i> SPRING. . . . .	98	„ <i>Nakaii</i> HAYATA. . . . .	3
„ <i>kelungensis</i> HAYATA. . . . .	97	<b>Themeda</b> FORSK. . . . .	82
„ <i>leptophylla</i> BAKER. . . . .	102	„ <i>gigantea</i> HACK. subsp. <i>caudata</i>	
„ <i>morrisonensis</i> HAYATA. . . . .	102	HACK. . . . .	82
„ <i>pseudo-invovens</i> HAYATA. . . . .	100	<b>Thuarea</b> PERS. . . . .	67
„ <i>Somai</i> HAYATA. . . . .	101	„ <i>samentosa</i> PERS. . . . .	68
„ <i>stenostachya</i> HAYATA. . . . .	102	<b>Thysanolaena</b> NEES. . . . .	66
„ <i>subcaulescens</i> HAYATA. . . . .	99	„ <i>Agrostis</i> NEES. . . . .	66
<b>Setaria</b> BEAUV. . . . .	67	<b>Trillium</b> LINN. . . . .	41
„ <i>glauca</i> BEAUV. . . . .	67	„ <i>Morii</i> HAYATA. . . . .	41
„ <i>italica</i> KUNTH. . . . .	67	<b>Tripogon</b> ROTH. . . . .	90
„ <i>pachystachys</i> FRANCH. et SAV. . . . .	67	„ <i>chinensis</i> HACK. . . . .	90
„ <i>viridis</i> BEAUV. . . . .	67	<b>Trisetum</b> PERS. . . . .	90
<b>Sorghum</b> PERS. . . . .	81	„ <i>subspicatum</i> BEAUV. . . . .	90
„ <i>fulvum</i> BEAUV. . . . .	82	<b>Triticum</b> LINN. . . . .	94
„ <i>halapense</i> PERS. . . . .	82	„ <i>vulgare</i> VILL. . . . .	94
„ <i>vulgare</i> PERS. . . . .	82	<b>URTICACEÆ</b> . . . . .	35
<b>Sphærocaryum</b> NEES. . . . .	58	<b>Zea</b> LINN. . . . .	68
„ <i>elegans</i> NEES. . . . .	58	„ <i>Mays</i> LINN. . . . .	68
<b>Spinifex</b> LINN. . . . .	66	<b>Zizania</b> LINN. . . . .	68
„ <i>squarrosus</i> LINN. . . . .	66	„ <i>aquatica</i> LINN. . . . .	68
<b>Spodiopogon</b> TRIN. . . . .	69	<b>Zoysia</b> WILL. . . . .	68
„ <i>formosanus</i> RENDLE. . . . .	70	„ <i>pungens</i> WILLD. . . . .	68
„ <i>hogensis</i> HAYATA. . . . .	70		
„ <i>Kawakamii</i> HAYATA. . . . .	70		



ICONES PLANTARUM FORMOSANARUM,

VII.

PLATE I.



### Explanation of Pl. I.

*Mahonia tikushiensis* HAYATA.

- Fig. 1. The plant.  
2. A flower.  
3. An outer sepal.  
4. An inner sepal.  
5, 6. Petals.  
7. A stamen.  
8. A pistil.





ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE II.

## Explanation of Pl. II.

*Pittosporum daphniphylloides* HAYATA.

- Fig. 1. A branch.  
2. A flower.  
3. A sepal.  
4. A petal.  
5, 6. Stamens, seen from different sides.  
7. Ovary.  
8. A seed-bearing carpel.  
9. A seed.







ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE III.

### Explanation of Pl. III.

*Geranium uniflorum* HAYATA.

- Fig. 1. The plant.  
2. A sepal seen from within.  
3. A petal.  
4. Stamens on the receptacle.  
5. Stamens.  
6. A pistil.  
7. A carpel with a seed.  
8, 9. Seeds, seen from different sides.  
10, 11. Embryos, seen from different sides.







ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE IV.

### Explanation of Pl. IV.

*Photinia daphniphylloides* HAYATA.

- Fig. 1. A branch.  
2. A flower.  
3. A petal.  
4. Portion of calyx, showing the insertion of stamens.  
5, 6. Stamens, seen from different sides.  
7. A flower-bud, petals taken off.  
8. The same, in section.  
9. Section of the ovary.





ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE V.



### Explanation of Pl. V.

*Abelia ionandra* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower.  
4. Corolla, expanded.  
5. Calyx with calyx-lobes.  
6. Stamens.  
7. Stigma.





ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE VI.

### **Explanation of Pl. VI.**

*Nertera nigricarpa* HAYATA.

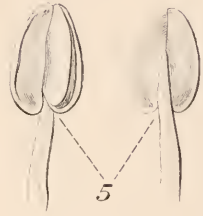
- Fig. 1. The plant.  
2. A leaf.  
3. A flower.  
4. Corolla, expanded.  
5. Stamens.  
6. Ovary.



3



6



5



4



2



1





ICONES PLANTARUM FORMOSANARUM.

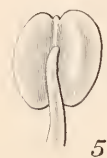
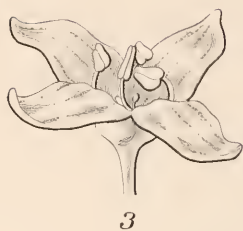
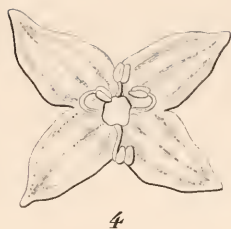
VII.

PLATE VII.

## Explanation of Pl. VII.

*Galium tarokoense* HAYATA.

- Fig. 1. The plants.  
2. A leaf.  
3. A flower.  
4. Corolla expanded.  
5, 6. Stamens.  
7. A young fruit.





ICONES PLANTARUM FORMOSANARUM

VII.

PLATE VIII.



### **Explanation of Pl. VIII.**

*Diospyros Sasakii* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A male flower.  
4. Calyx.  
5. Corolla, expanded.  
6. A portion of the corolla.  
7. Stamens.





ICONES PLANTARUM FORMOSANARUM.

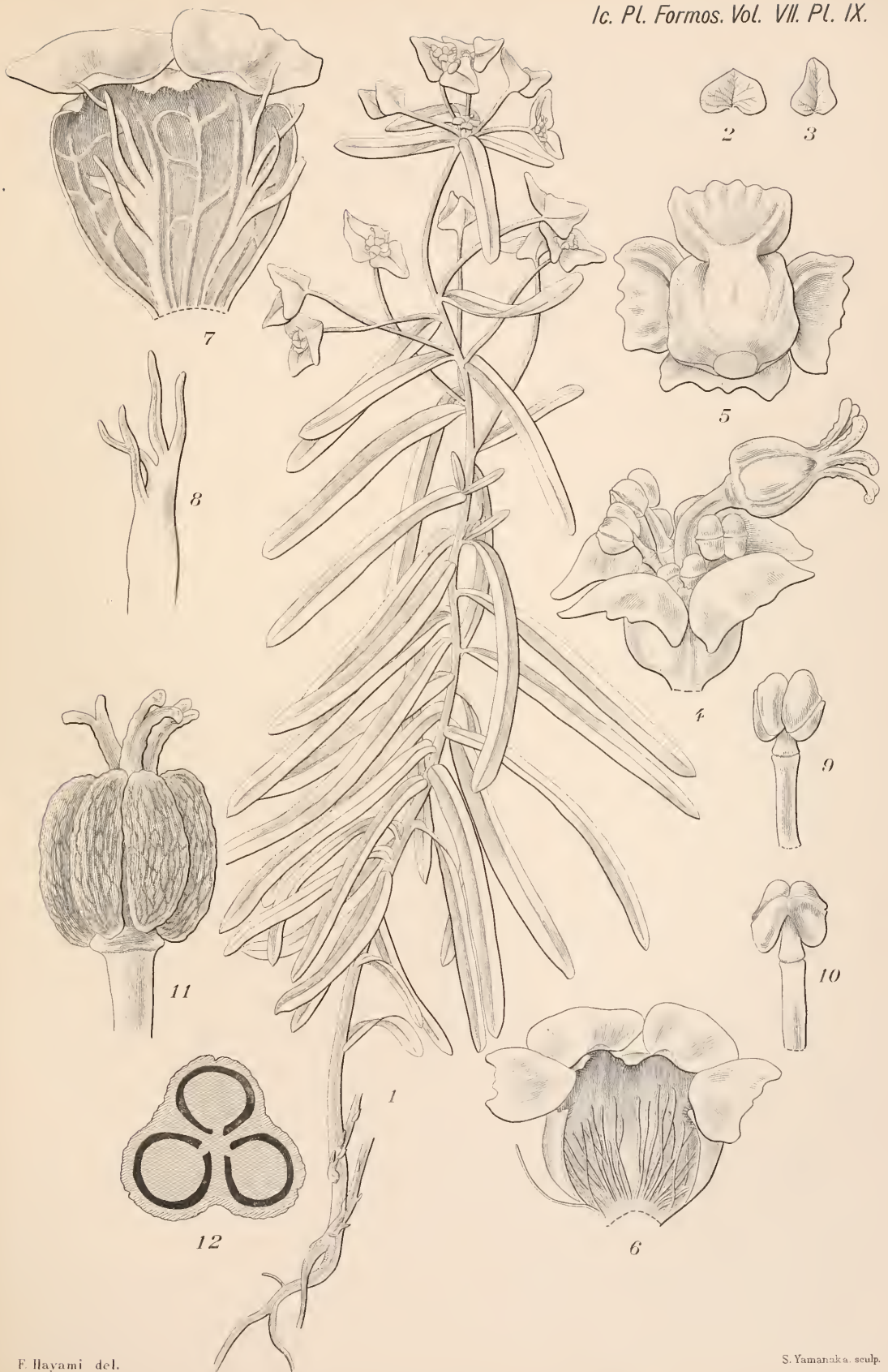
VII.

PLATE IX.

### Explanation of Pl. IX.

*Euphorbia tarokoensis* HAYATA.

- Fig. 1. The plant.  
2, 3. Floral leaves.  
4. An involucre.  
5. The same, seen from a different side.  
6. The same, expanded.  
7. A portion of the same.  
8. A bract in the involucre.  
9, 10. Male flowers.  
11. A young fruit.  
12. Section of the same.







ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE X.

### Explanation of Pl. X.

*Quercus Sasakii* KANEHIRA.

- Fig. 1. A branch.  
2. A leaf.  
3, 4, 5. Glans, seen from different sides.





ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE XI.



## Explanation of Pl. XI.

*Quercus tarokoensis* HAYATA.

- Fig. 1. A branch.  
2. A male flower.  
3. Perianth, expanded.  
4. A bract.  
5. A fruit.  
6. A glans.  
7. A cup.  
8. The same cup, magnified.





ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE XII.

### Explanation of Pl. XII.

*Dendrobium erythroglossum* HAYATA.

- Fig. 1. The plant.  
2. A dorsal sepal.  
3. A lateral sepal.  
4. A petal.  
5. A labellum.  
6. Margin of the labellum.  
7. Column.  
8. Apical portion of the same, seen from back.  
9. Operculum, seen from side.  
10. The same, seen from back.  
11. Pollinia.







ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE XIII.

### Explanation of Pl. XIII.

*Liparis keitaoensis* HAYATA.

- Fig. 1. The plant.  
2. A flower.  
3. A dorsal sepal.  
4. A lateral sepal.  
5. A petal.  
6. A lip.  
7. Column.  
8. The same, seen from side.  
9. An operculum and pollinia.





ICONES PLANTARUM FORMOSANARUM.

VII.

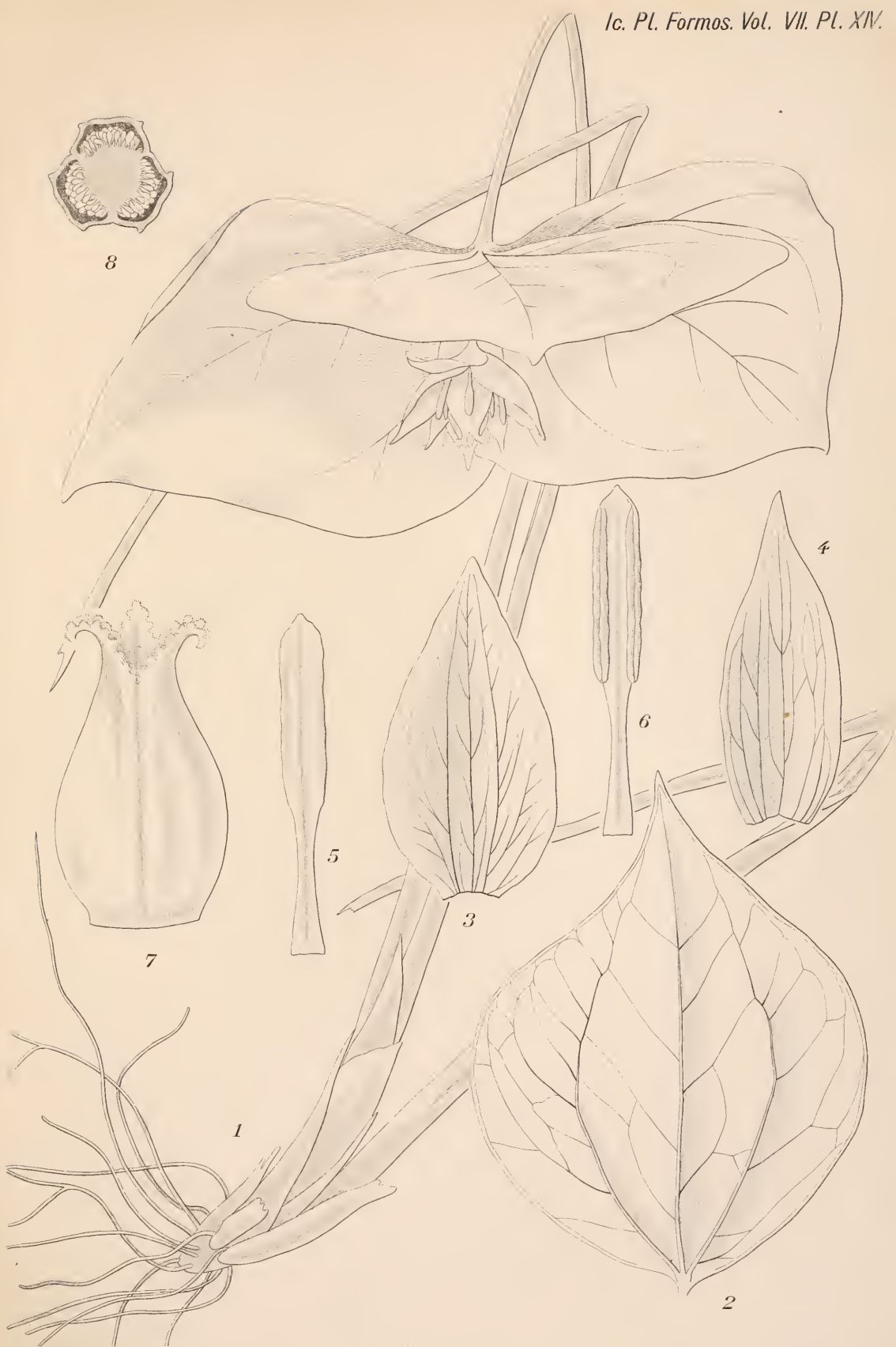
PLATE XIV.



## Explanation of Pl. XIV.

*Trillium Mori* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A sepal.  
4. A petal.  
5, 6. A stamen, seen from different sides.  
7. Ovary.  
8. The same in section.  
Fig. 1 and 2, natural size ; others more or less magnified.





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